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MAY/JUNE/JULY 1996

COMMODORE WORLD

THE NEWS MAGAZINE FOR COMMODORE 64 & 128 USERS

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POSTMASTER: Send address changes to: CW Address Changes, c/o Creative Micro Designs, Inc., P.O. Box 646, East Longmeadow MA 01028-0646.

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From The Editor

WERE YOU WONDERING WHERE WE WERE?

bout now, you may be asking yourself why it took those lazy bums at CMD so long to get Issue 15 out to subscribers and why the issue is a bit thinner than previous issues? You've probably even begun thinking of worst case scenarios. Is it that they are going to stiff me like so many previous Commodore magazines have? Is it that they just don't care? Are they getting out of the Commodore market?

We've heard all of these questions over the past few weeks and can truthfully answer NO to all of them! Before I get into my explaination, let me first tell you why CMD couldn't afford NOT to fulfill its obligations to subscribers. It's quite simple—we have a whole lot more at stake than most magazine publishers, in that if we fail to meet our obligations on CW we'd likely loose you as a CMD customer as well! If that happens we loose big! Besides, our commitment to this market runs much deeper than a simple business obligation. We have about a half a dozen people who have dedicated the last nine years of their life to the survival of our beloved C-64 and C-128 platform. So without laying it on too thick, let me simply say that our subscribers need never question our commitment to Commodore World!

The delay of this issue has several attributing factors. Most importantly was the loss of our chief graphic artist and page layout person, Jenifer Esile. In late May, Jenifer was approached by a large regional publication who made her an impressive offer; so good in fact, that she couldn't refuse. So, with our blessing and encouragement, she's moved onto greener pastures. Given the demands of the position she vacated here, we've had great difficulty in finding someone to pick up where she left off. So much so that it took us several weeks to find someone to help out.

Additionally, virtually every available body at CMD has, in some way, been working on the release of the SuperCPU 64 (which should be shipping by the time you read this editorial). Doug Cotton has been writing the manual for it, so he hasn't been as available to perform many of the editorial tasks that he routinely performs. Mark Fellows has been chasing down the last few glitches in the product. The rest of us have been pushing to make sure that advanced orders are ready, manufacturing is cranking out the finished product, disks are duplicated, and all is ready as soon as we get the green light to ship.

The final factor involved was our acquisition of the Commodore R/T on GEnie. Many days were put into negotiations and the transition. As a result, CMD is working to create a reliable, easy-to-access, and affordable way for the Commodore community to communicate with each other and access the internet. We are just beginning to settle into our managerial role on Genie, and are studying what services can and will be provided. Thus, you won't see any big splashy ads for the time being. What I can tell you is that we're seeing dramatically improved activity on the service. We're also arranging a full schedule of events, guest conferences, and more, including some new hosts to make things interesting!

Finally, why has CW shrunk a bit since the last issue? Time. Although we've found a replacement for Jen, are about to start shipping the CPU, and continue to improve Genie's Commodore R/T, another week or two would have been required to fill the 56 pages that we usually have. So in the interest of getting you issue 15 while its contents remain current, we've cut a few ads and edited down a couple of artcles!

Now that I've brought you up-to-date on the reasons your issue is late, and hopefully reinforced your faith in CMD, let me close by saying thank-you to each and every one of you for your understanding and support. And with that said—go enjoy the rest of your summer!

Charles Christianson
VP of Sales & Marketing

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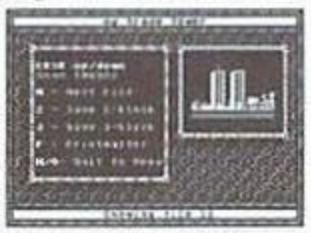

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BACKTALK

LETTERS AND QUESTIONS FROM OUR READERS

Ink Jets... Color Ones, Too!

I own a C-64, with a 1541 drive, 1581 drive, Xetec Super Graphix printer interface, an MPS 803, Panasonic 1180, and Star NP-10 printers.

Are there any ink-jet or laser printers that can be used with this existing equipment? If so, please list several specific models that I could use.

Are there any color printers that could be used with my equipment? Again, please list several specific models that would work for me.

Although I'm on my second annual subscription to your wonderful magazine, I haven't yet come across an article dealing specifically with these questions.

I'd really appreciate your help in this matter.

- Ronald T. Bulmer

If you're on your second subscription, I would suspect that you should have at least Issue 7, which featured the article, 'A Tale of Two Printers' by Ron Hackley. Ron's article described his own experiences with trying out a couple of ink-jet printers—the Epson Stylus 800, and the Canon BJ-200e. Ron determined that the Epson was inferior for Commodore users.

But the printer market, being what it is today, seems to change models quickly, and the model that Ron decided was the better of the two isn't available any more. The BJ-200e was superceded by the BJ-200ex, but that model has also been closed out (although you might still find one via mail order).

Currently Canon doesn't even make a low-end black-only ink-jet printer. They decided to make a low-cost color ink-jet instead, which is the Canon BJC-210. The bad news, however, is that the color control for this model is non-standard. Canon will gladly tell you that if you simply use the supplied Windows driver, this printer will print color just fine. Nice move. While this printer will perform black printing for us 'mere Commodore users', Canon only ships it with a color cartridge... and a black cartridge will run you around $25 to $30 from most suppliers.

Luckily, Canon does still make a fine color model (last time I checked) that provides compatibility with the industry-standard Epson 24-pin color codes: the Canon BJC-4100. You may also find some of Canon's older color printer models such as the BJC-4000 or the BJC-600; either of these can be used as well.

The only other ink-jets I can comment on personally are the HP DeskJet printers. My advice on those is, don't bother. HP does their own thing, and though you may find a GEOS driver for them, that's about all you'll find.

Laser printers are a similar hazard: unless you get one with some kind of Epson emulation mode, it won't be useful for much—and you'll need a more expensive one with Postscript in order to use it under GEOS. Don't get me wrong here, though—if all you need is great quality for GEOS, then most any of the current crop of Postscript laser printers will be a boon for you.

If you want to save some money but still want the ability to output color, then a good choice would be a color dot-matrix printer. The Panasonic KX-P2135 is a good choice here, but most any modern 24-pin color dot-matrix printer will have the same level of compatibility. I'd avoid Epson brand, though—they haven't maintained backwards-compatibility as well as most of their competitors have.

A word of warning: most older applications won't support color printing on 24-pin printers, or on color ink-jet printers like the Canon which emulate 24-pin color printers. In addition, many older graphical printing applications do not have 24-pin printer drivers, and will produce output that is vertically elongated. This latter problem is caused by differences in the vertical size of the print-head (9-pin printers have fewer pins, and even though the 24-pin printer's pins are packed more densely, it still comes out a wee bit taller). You can sometimes overcome this problem by putting the printer into IBM Proprinter X24E mode with AGM off, but on newer models there aren't any switches to accomplish this; instead, you're expected to use the supplied Windows setup utility. 'Progress' takes another step toward eliminating non-WINTEL platforms.

One last problem: these printers are sheet-fed, and thus can't print all the way to the top and bottom of the page. This can also cause data at the end of a graphically-generated page to wrap to the next physical page.

Despite the problems, if you use these printers with applications that do provide adequate printer drivers, the results are quite impressive. The catch is that such programs are few—GEOS, I Paint and GoDot! are among the few graphical printing programs with support, and even in GEOS the sheet-fed problem still exists—at least for now.

Programs that print in text mode, however, do work quite well, so provided your printing requirements consist of compatible applications, or if you have a 9-pin printer to fall back on for incompatible ones, an ink-jet printer can be a nice addition to your hardware.

Assemble Here

In Issue 10 (Assembly Line) you demonstrated how to talk to serial devices with 'high-level' routines. The sample program had labels where error checking routines were to be installed, and which were to be covered in a later article, but I was unable to find these routines in any later issues. Would it be proper to mix the 'low level' error routines from Issue 11 with the 'high-level' program of Issue 10?

I'd also like to know, are Power Assembler and Buddy Assembler the same?

Finally, how many issues of Transactor were published, and how can I get back issues of it?

- Howard M. Little, Sr.

Jim Butterfield took over Assembly Line with Issue 11, and amidst the changeover it appears that we forgot about those routines. Rather than do them ourselves, though, this seems like a good opportunity to see if our readers picked up on how high-level serial bus access is managed (part one), and on the general flow of handling errors (as provided in the low-level routines in part two).

Thus, I'd like to challenge any of our readers who feel up to the task to write the missing routines, and send them in. We'll publish the best solution received in Issue 17, and we'll also reward the author of the entry with a CMD gift certificate.

Buddy Assembler was, at one point, Power Assembler. Buddy, however, is what the author called the program after taking it back over, and has been upgraded several times since.

I've no idea offhand how many Transactor issues there were, but your only real chance of getting any at this point is to obtain them second-hand.

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COMMODORE TRIVIA

by Jim Brain

Welcome to another edition of Commodore Trivia. As many of you may know, these trivia questions and answers have been donated by me to the Commodore community at large. Unlike other articles in *Commodore World*, these trivia questions have been placed in the public domain. I ask only that the trivia questions remain intact and unchanged, and that my name and address appear somewhere so users can contact me. The trivia is also used for a contest I run on the Internet; contact me at the included address for more information. Because curiosity has the best of me, I always welcome a note or postcard detailing where the trivia goes. I also welcome new questions—provided they come with the answers. Enjoy!

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COMMODORE TRIVIA #14 QUESTIONS

$0D0 How many keys were there on the "original" PET and what was special about them?

$0D1 How do you produce the "hidden" message(s) on the C-128?

$0D2 How much memory did the "original" PET show on bootup?

$0D3 We all know the "reboot" sys for the 64 is sys 64738, but who knows the same sys location to reboot the CBM 8032?

$0D4 Which computer(s) beeped at bootup? (May be more than one, but only one required.)

$0D5 How much memory did the CBM 8032 show on bootup?

$0D6 Certain Commodore computers provided empty EPROM sockets on the motherboard. Give me the number of empty sockets on the following machines:

a) CBM 30xx.
b) CBM 8xxx.
c) CBM C128.
d) Plus/4.

$0D7 In Germany, the CBM 8032 came with a 4kB EPROM for the Exxx area, while the US version only had a 2kB EPROM. Why?

$0D8 Who published the first PET memory map in the "PET Gazette"?

$0D9 Which is faster to move the cursor on a PET/CBM or C64: SYS or PRINT?

$0DA On the Amiga 1000, where are the signatures of the first Amiga developers located?

$0DB On the 6502, what does the accumulator contain after the following is executed:

```
lda #$aa
sed
adc #01
```

$0DC What is the model number of the US NTSC VIC-II chip?

$0DD What is the European PAL VIC-II chip's model number? (Not sure if that's its correct term, but I hope you understand).

$0DE Assume you have two computers, one with each of the above chips inside. Which chip draws more pixels on the screen per second?

$0DF In Commodore BASIC, which statement executes faster:

A= 2-2 or A = 2+2

COMMODORE TRIVIA #13 ANSWERS

$0C0 Alps.

$0C1 Newtronics.

$0C2 Alps: push-type latch, round LED. Newtronics: lever-type latch, rectangular LED.

$0C3 0. According to Commodore BASIC, the answer should bby -1, which is the BASIC value of TRUE. However, the above equation is NOT true. Doing PRINT SQR(9) yields 3, but doing PRINT (SQR(9)-3) yields 9.31322575E-10 (C64). This anomaly can be attributed to roundoff errors in the floating point math routines in Commodore BASIC.

$0C4 B = -1. The second statement is the one to look at. The second equals sign is treated as a comparison, while the first is treated as a assignment. B gets set to the outcome of the comparison, which is TRUE (-1).

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$0C5 Sanyo. Specifically, Model M1540A. What a model number!

$0C6 On BASIC 2.0 or greater:

```
?SYNTAX ERROR IN 20
READY.
```

On BASIC 1.0: (found on the PET 2001 series)

```
J=0
READY.
```

BASIC 1.0 totally ignored spaces, so line 20 became "IFJ=0GOTO40". That statement would be correctly parsed, since it contains the "GOTO" keyword.

However, on BASIC 2.0 or greater, spaces weren't ignored so completely, and the "TO" in "GO TO" would be tokenized separately, so some code was added to BASIC to check to "GO". As the code that accepts GOTO as a special case for THEN after an IF statement wasn't patched this way, the above fails, because GO is not a valid keyword after IF. The statement SHOULD work correctly, but does not because of this failure to fix the IF command parsing.

On BASIC 2.0 or greater, substituting the following line for line 20 will cause the program to work:

```
20 IF J=0 THEN GO TO 40
```

$0C7 Germany.

$0C8 24. Two rows of 12 contacts each.

$0C9 According to Commodore documentation, a _physical_ screen line is defined as one screen line of characters. A _logical_ screen line is defined as how many _physical_ lines can be chained together to create a valid BASIC program line.

With that in mind, most Commodore computers chose a _logical_ screen line that was a multiple of the screen width. This works fine for 40 and 80 column screens, but what do we do with the VIC-20, with its 22 column screen. Solution: make the _logical_ line length equal to 4 _physical_ lines, or 88 columns.

When the Commodore 128 was introduced, the number rose to 160 characters, which is 4 _physical_ lines in 40 column mode, or 2 _physical_ lines in 80 column mode. However, you can only take advantage of this in 128 mode. 64 mode is limited to 80 characters.

To add to all this confusion, a valid BASIC program line (in memory) can actually be 255 (tokenized) characters long, but creating such a long line cannot be done from the built-in editor in direct mode.

The AmigaBASIC, available on the Amiga, also does not have the 80 column line limit. However, that BASIC is SOOO much different that I am not surprised. The older CBM BASICs, on the other hand, were all derivatives of the original Level I BASIC for the PET.

$0CA The filename will show up as "A"B, with the 'B' showing up to the right of the "" mark. This could be used to make program loading easier. A file that showed up as "filename",8,1 could be loaded by simply hitting shift-run/stop on that line.

$0CB References I have on hand say 128 characters. However, the actual code on the 8032 and the C64 acts as though 187 characters can actually be sent (tape buffer-5 control bytes = 192-5=187). The references that claim 128 characters are Nick Hampshire's _The VIC Revealed_ and _The PET Revealed_. Anyone care to lay this one to rest?

$0CC 66 keys. This is the same number as found on the VIC-20 and the Commodore 16.

$0CD TAB((163) and SPC((166).

$0CE 1) Serial /SRQIN
2) GND
3) Serial ATN IN/OUT
4) Serial CLK IN/OUT
5) Serial DATA IN/OUT
6) /RESET

$0CF 6. Opposing pins on the connector are hooked together electrically.

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ON THE HORIZON

COMMODORE AND COMPUTER INDUSTRY NEWS

Novaterm 9.6 Releases

Seattle, WA (July 4, 1996) - Nick Rossi announced the long-awaited official release of Novaterm 9.6 today. With a broad range of new and powerful features, Novaterm 9.6 promises to remain the communications software of choice among Commodore users. Novaterm 9.6 offers significant new features that Commodore users can no longer do without, whether they are surfing the Internet, using on-line networks like GEnie and Delphi, or dialing BBS systems.

For file transfers, the Zmodem protocol has been expanded to support uploading, downloading, and recovery of aborted downloads (often called "crash recovery" or "resume"). In addition, two new protocols have been added: Ymodem-g and Xmodem-1k-g. These are streaming protocols, which download data non-stop into the buffer. Zmodem upload and crash recovery, Ymodem-g, and Xmodem-1k-g have not been available on a Commodore computer until now.

The functionality of the buffer has been greatly expanded. Novaterm's buffer now uses any memory expansion device as buffer space. Novaterm 9.6 includes drivers to support the REU, BBGRam, GEORam, C128 VDC memory, and DACC partitions in a RAMLink or RAMDrive. Using one of these devices provides a huge amount of memory for capturing text or downloading files. What's more, the contents of the buffer remain intact even if a user leaves Novaterm to use a different application. In fact, as long as the memory device is not overwritten or lose power, the buffer files are there when a user loads Novaterm again. That means a RAMLink or other powered devices will retain the buffer contents even if the computer is shut off. Users will no longer lose buffer files that they forgot to save to disk.

Novaterm 9.6 allows Commodore 128 users to take advantage of the C128's 80-column screen. Novaterm is able to use the 80-column screen for terminal mode, and all of the terminal emulations may be used in conjunction with it: ANSI, VT100/102, VT52, and Standard. Novaterm can display either 25, 28, 43, or 50 lines on the 80-column screen. In this mode, Novaterm switches the C128 processor to 2 MHz, providing the fastest possible display. The speed of the 80-column emulation has been improved, and a special driver has been included for REU users that uses the REU to implement a fast scroll. The performance of Novaterm 9.6 in 80 columns is far superior to previous versions.

Novaterm still supports the SwiftLink, of course, but other serial devices may also be used with Novaterm now. Performance Peripherals' CommPort device is supported, as well as the HART cartridge. In addition, Daniel Dallmann, a Commodore enthusiast from Germany, has devised a way to attain 9600 bps through the Commodore's user port. He wrote a driver for Novaterm 9.6, allowing it to reach 9600 bps without a cartridge.

Novaterm 9.6 provides many other conveniences. It has an 80-column file viewer. It has ASCII translation and UUencode/decode options. It can read the time from real-time clock devices. It supports a complete scripting language for automated sessions. It comes with a text editor and a miniature BBS module. Especially useful to novice users is a user-friendly configuration utility that leads a person through the setup step by step.

Novaterm is no longer shareware; it is now commercial software. Novaterm 9.6 sells for US$29.95. It comes on either a 1541 or 1581 disk, and it is shipped with a printed user's guide.

When a Commodore user group registers with a one-time US$30.00 registration, its members become eligible to receive a 50% discount on purchases of Novaterm 9.6.

For serious modem users, there is simply nothing better than Novaterm 9.6!

(E-mail:voyager@eskimo.com, WWW:http://www.eskimo.com/~voyager/novaterm.html).

New Game Releases from Threshold

Threshold Productions International has released three new games for the C-64. Two of the new titles, Hans Kloss ($14.95) and Zamczysko ($9.95) are 'platform' games. As Hans Kloss, you must search Hitler's bunker for pieces of the plans to a doomsday machine. The theme may not be politically correct in the western world, but the game is well done. In Zamczysko you'll search a castle for keys and diamonds, though you'll be hindered by bats, snakes, and other hinderances. The remaining game, Acid Runner ($14.95), is an arcade game that will please Lode Runner fans. All three games feature good graphics and game play, and are available for immediate shipment. *Threshold Productions International, 17730 15th Ave. NE, Suite #229, Seattle, WA 98155 (E-mail: tpinfo@eskimo.com).*

Escom Files for Protection

The German PC manufacturer Escom AG, recently filed for protection from its creditors after stockholders refused to make up for the company's large losses. This news came only days after a final agreement between Escom and VIScorp had been reached, in which VIScorp is to take control of all personnel and assets of Escom's Amiga Technolgies, Gmbh. subsidiary. In addition, the deal provides VIScorp with the rights to all technology previously owned by Commodore and purchased by Escom last year, with one exception—Escom is to retain rights to the Commodore Trademark to use with their own line of PC's.

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While the reported $40 Million deal is not expected to sour due to the filing, the German PC manufacturer faces additional problems: the Securities Trading Supervisory Office in Germany has announced it is investigating the company for alleged insider trading issues.

G & G Closes Out Specialty Cartridges

We recently received information from G & G Electronics indicating that they were closing out several Commodore cartridges for amatuer radio applications.

The products listed are SWL, a receive-only cartridge for CW and RTTY (Baudot & ASCII) for the Commodore 64/128 ($29.95); MORSE COACH, a complete teaching and testing cartridge-based program for learning Morse code on the Commodore 64/128 ($19.95); and AIR-1, a complete interface system for sending and receiving CW, RTTY (Baudot & ASCII), and AMTOR, for the Commodore VIC-20 ($39.95). Both the SWL and AIR-1 cartridges are supplied with software in ROM. Shipping for each of the cartridges is given as $5.00, and quantities were limited.

G & G Electronics, 8524 Dakota Drive, Gaithersburg, MD 20877, 301-258-7373.

OceanPC Announces Commodore II PC?

This one has to go down in the anals of completely obscure coincidences. OceanPC, a Seattle firm specializing in computers built for the rigors of marine applications, recently announced their new Commodore II PC. So, what's a Commodore II? As it turns out, it's an Intel Pentium system that has been specially packaged to reduce the effects of shock and salt water intrusion and corrosion.

Okay, so the name isn't that odd considering the market the company services, right? True enough. But what really got us was the order number for the system provided on the order form. The ordering code for the Commodore II PC is CMD2000.

Release of Little Red Reader-128 verions 2.5.

Since release 2.0, a few bugs have been fixed, including the problem of not properly logging in MS-DOS disks sometimes which used to result in garbled directory listings. Date support has been added for reading and writing files, as well as the ability to abort commands and better error reporting. A number of other nicities have been added too, including the ability to count the bytes of selected files in a directory and to remove Commodore files, to make it more convenient to back things up to MS-DOS disks.

Two things that are NOT in this release are the ability to format MS-DOS disks and compatibility with RAM-DOS. RAM-DOS uses the graphics area for its purposes, and that takes up too much memory. I don't know what would happen if you threw out the graphics area with a "graphic clr".

The files are available from FTP host "ccnga.uwaterloo.ca" in directory "/pub/cbm/util128" in the following files:

lrr25.uua (uuencoded archive)
lrr25.doc (documentation)
lrr25.asm (assembly source)

or through my homepage in "http://ccnga.uwaterloo.ca/~csbruce/mycommie.html".

Here's a summary of Little Red Reader (LRR):

Little Red Reader is a program that allows a C128 (but not a C64) to copy files to and from MS-DOS floppy disks. The menu-driven program requires two disk drives to work, where the one containing the MS-DOS disk must be a 1571, 1581, or CMD-FD. With the CMD FD's, the program supports the 1.44-MB (high-density) disk format. The program does not buffer data internally, so the only size restriction on copying is the capacity of the target disk. The program provides PETSCII/ASCII conversion but will work only with the root directories of MS-DOS disks. The program is also available via FTP and is FREE. It appears that the latest version is not compatible with RAM-DOS.

CMD Captures Genie

The Commodore Roundtable on the Genie Online Service, formerly operated by Parsec, Inc., is now being managed by Creative Micro Designs, Inc. CMD plans to expand the features offered in the Roundtable to include special support for Commodore World readers. In addition, CW will be bringing readers news of planned events on Genie, such as special guest speakers appearing in the Conference area.

The change in management comes amid rumors of a Genie shutdown. These rumors are based on reports the new Genie owners, Yovelle Reniassance Corp., has defaulted on payments owed to General Electric Information Service, previous owners of the service. Lawyers for YRC confirmed that they had defaulted, but claimed that this was due to a dispute with GEIS over the number of active Genie subscribers that GEIS had supplied to YRC in negotiating the sale. YRC also claimed that there was no immenent danger of the service shutting down, despite the fact that GEIS had moved to block collection of further Genie subscription fees.

While there has been no official word at this point, reliable sources have indicated that GEIS has approached YRC with an ammended payment schedule based on reduced numbers, and YRC appears to be quietly optimistic that the dispute can be remedied in the short term.

SuperCPU 64 Finally Readies for Shipping

After a number of delays, CMD has announced that the SuperCPU 64 is now being prepared for shipment, indicating that the first units should be in the hands of users by the end of July.

CMD indicated that the causes for additional delays were due to final problems found in making the unit work correctly over widely varying signals found in various Commodore computer models. One specific problem that caused delays was that DMA doesn't work correctly on C-64c models during the first few seconds they are on. CMD initially thought this to be a SuperCPU problem, but intensive testing indicated that the problem was actually the C-64c timing itself, and that the DMA failure was present even without a SuperCPU attached. In the end, CMD determined that nothing could be done to resolve the problem, but that users affected by the problem would normally see it with or without the SuperCPU.

CMD has also announced that the 64 version of the SuperCPU will be unable to support using the C128's 80-column screen from 64 mode. Commodore made this impossible by blocking the write control to the 80-column VDC chip from the cartridge port. CMD states that the 128 version of the SuperCPU will use a special adaptor to get around this and other quirks of the 128 hardware design.

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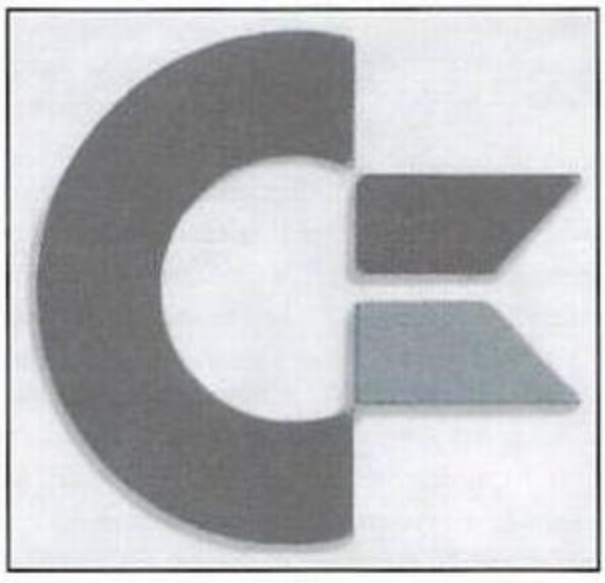
Just For Starters

by Jason Compton

THE GREAT CARTRIDGE EXPANSE

The Commodore 64 was launched with a set of expansion ports unique to its design. The role that the bus designers foresaw for the "expansion", or cartridge, port of the C-64 and 128 was probably not the same as that seen by modern-day Commodore developers. The past fourteen years have brought a slew of cartridges, some forgettable and some eminently useful, and the present holds a great deal of promise.



ROM Cartridges

Early in the 64's life, floppy drives were very expensive, making disks a fairly unattractive medium for personal storage and commercial publication. The other alternative, cassette tape drives, were relatively cheap and the storage medium plentiful and abundant, but loading from tape can be a horribly slow process, requiring up to a half an hour to load a single program.

Enter ROM cartridges (read-only memory, indicating a memory chip or chips with data that cannot be altered or erased). More expensive to build and reproduce than cassette tapes, cartridges provided a medium that any C-64 user could take advantage of, without requiring the ownership of an expensive disk drive or a painful tape drive. Cartridges can be plugged directly into the expansion slot, and when the machine is powered on, the computer has almost instant access to the program. And from a marketing standpoint, cartridges were a well-established and understood concept among the general buying public, who had already been introduced to cartridge-based consoles such as the Atari 2600.

Generally, the first cartridges contained relatively simple but charming games such as Radar Rat Race and Crisis Mountain, and several big names in the industry, such as Sega and Parker Brothers, brought their popular titles to Commodore cartridge slots. Commodore also published a few personal utility programs on cartridge, as well as the BASIC enhancer Simon's BASIC, but in time the cartridge lost its appeal as the more flexible floppy drive, with its dirt-cheap mass-production of disks, came down in price.

But the cartridge port would not rest and collect dust so easily. With the cartridge port freed up, developers sought new and more innovative applications for the powerful slot.

Fastloaders

Floppy drives (in general, trusty 1541 units) were in millions of homes by then, and people started discovering a drawback to the use of Commodore floppy drives: access was pretty slow. Not as slow as cassette tapes had been, but still at a pace that was rather inconvenient to the average user. It didn't take long for developers to discover a number of means, entirely through software, to make the 1541 and C-64 talk to each other more rapidly. The problem with these solutions was that they had to occupy a small but significant portion of the computer's memory at all times, meaning that a large program, or one with its own loading routines, could easily corrupt the new routine.

So companies turned to the cartridge port as a way to store their rapid disk access methods without infringing on the computer's standard 64k of memory. The trusty favorites in this category were FastLoad from Epyx and Mach-5 (C-64) and Mach 128 (C-128) from Access. Both offered increased load and save speed, a DOS wedge, and a rudimentary set of disk utilities. While the rapid loading routines of these cartridges were not always compatible with commercial software, particularly copy-protected programs, in general they served users and kept them reasonably happy with their disk access.

RAM Expansion

When the Commodore 64 was released, it was the most cost-effective computer in its class. Its standard 64k was greater than all but the high-end (and high-price) IBM PC line. Over time, users began to recognize that to handle serious quantities of data often requires a great deal of available memory, and that 64k was simply not sufficient. The inception of GEOS, the powerful but memory-intensive graphical operating system for the C-64 and 128, only added to this frustration, as a new line of easy-to-use tools offered the potential to work with large documents, but were hindered by the 64's memory limits. While the release of the 128k C-128 helped to some extent, for 64 users unwilling to change computers, the RAM expanders were a blessing.

Initially produced by Commodore but later taken up by several other companies, including GeoWorks and CMD, RAM expansion units live in the cartridge slot and offer the use of RAM disks (exceptionally fast areas of memory used for storage much like a floppy disk) and additional document space for programs designed to take advantage of them (usually GEOS and related applications). The first RAM expansion units offered as little as 128k of extra storage for the C-64. Soon, with the introduction of the Commodore 1750 and 1750 Clone and the GEOS-specific GeoRAM, 512k became the high-end standard for extra memory.

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Over time, even more memory expansion became possible through such products as the BBGRAM and the RAMLink. Both can be battery-backed (so that even if the 64 loses power, the contents of expansion memory remain intact). The BBGRAM was available in up to a 2 megabyte form. The CMD RAMLink can hold up to 16 megs and contains JiffyDOS, CMD's high-speed disk access protocol for even faster access to memory storage. The CMD RAMLink also offers a cartridge passthrough slot; the usefulness of which should be growing more and more apparent.

Better Video?

One of the laments of high-end C-64 users is the machine's limited text resolution of 40 columns of characters eight pixels wide. While GEOS attempted to relieve the restriction somewhat, some wanted a solution that would work with existing software and would allow an 80-column text display, like that offered by computers like the IBM, Amiga, and Macintosh.

To this end, various workarounds developed. One found its way onto a cartridge, presumably in order to better reside in the Commodore's memory. The 80 column programs do not enhance the Commodore's basic graphics capability (a displayable area of 320x200 pixels, 320 pixels wide divided by 8 pixels wide equals 40 columns of text) but instead alter the way it thinks of characters (320x200, 320 pixels wide divided by 4 pixels wide equals 80 columns). In effect, everything becomes 50% thinner.

The workaround only proves mildly compatible with existing software, and is only readable under certain color combinations. The rest are too blurry to discern. Overall, the 64 80 column mode is a disappointment. Those serious about 80 column mode would be well advised to investigate the C-128's true 80 column mode, which is considerably superior.

Serial Speed

Commodore users, like other computer users, are never satisfied; feeling that the grass is greener on the other side. For some time, the standard for modem speed was 2400 baud, a speed most Commodore terminal software supported. Modems made exclusively for the Commodore User port (the port on the opposite side from the cartridge port) as well as specific serial adapters designed to allow the use of industry standard modems supported this speed. But after a time, the industry began pulling away, first with the popularization of 9600 baud modems, and then pushing beyond to 14,400 (14.4) and 28,800 baud.

Users tried to squeeze more from their user port, but the modem manufacturers weren't catering to the 64. A conventional solution wasn't in sight. Then came SwiftLink. Initially promoted as a way to use the new 9600 baud modems on the 64, but later realized at speeds capable of supporting the high-end 28,800, the SwiftLink puts an industry-standard 9-pin serial port on the Commodore's cartridge port. This means that for a reasonable investment, Commodore users have access to the same speed of connectivity that PC owners feel makes them gods.

Double-Barrel SID

The Commodore 64's musical abilities have been much lauded over the years. For years, it offered better sound than standard IBM PCs, and its compactness and ease of use were quite appealing. The SID chip, the heart of the 64's sound generation, has been the subject of technical journal articles, and has been explored by serious musicians and hackers alike. Somewhere along the line, the two pursuits merged and the SID Symphony cartridge was born.

The cartridge contains a second SID chip and, for those programs and songs designed to take advantage of it, will use the two chips in tandem for a combined 6 voices of synthesized sound.

The Super Cartridges

While it's fun to play with more sound and music and to have speedy telecommunications, the fact of the matter is that a number of users were looking for new avenues to explore their machines with, and needed more power and disk speed than the FastLoad and Mach line offered.

Thus sprung the "super cartridges". Among this generation of utility and fast loading cartridge was the Explode, the Super Snapshot, the Final Cartridge, and perhaps the best and most powerful super cartridge of the lot, the Action Replay. While no two super cartridges are exactly the same, each was built with some or all of the same features and goals in mind.

Better and faster disk access was of course a high priority. Most cartridges offered some sort of "monitor", a program used to directly examine and alter memory. All included a reset button, used to escape from machine crashes without powering down, or to escape from a program with the memory intact for later examination. They picked up where Simon's BASIC left off, adding new commands to BASIC to make its use easier. Many included a new and innovative capability called "freezing."

Freezing involves halting the program currently loaded and entering into a special menu of options provided from the cartridge. Options include the ability to save the current screen as a picture, the ability to make an exact backup copy of the program (allowing you to reload the program at the exact point of the freeze; convenient for games which don't allow you to save your progress), or on the Action Replay, enter monitor mode and alter the program as it ran.

Avenues are opened up for frustrated gamers, budding programmers and explorers with these units. The best in my experience, and the only one still widely available, is the Action Replay. Its freezer is second to none, and provides a useful set of utilities and disk access programs. Some cartridges have individual assets that outshine the others (FastLoad still has one of the best disk editors, and Final Cartridge III has a graphical interface environment), but AR is the most well rounded.

Juggling Cartridges

Now that you have all of these cartridges, you face the truth: you have more useful cartridges than you have cartridge slots. Devices such as the EX2+1 or EX3 circumvent this problem.

At first, cartridge expansion devices were intended to "avoid wear on the cartridge slot" by providing you with four new cartridge slots you could plug your favorite games into. By flipping a switch, you could choose which cartridge you wanted to be active, and could swap out games on the expansion unit rather than the main computer.

As the expansion devices such as SwiftLink came about and the usefulness of super cartridges was apparent, a new solution was needed. Cards like the EX3 allow multiple cartridges to be active at once, so using your favorite term program and 14.4 modem with a SwiftLink won't keep you from programming in your Action Replay anymore.

Last But Not Least: Accelerators

What more could you do with the cartridge port? Over the years, that question has been asked and answered many times. The most dramatic statement has been in the development of Commodore accelerator cards, bringing increased speed to the computer itself through the port initially conceived of for a game of Tapper.

The early entries came at speeds of 4 and 8 MHz; significant improvements over the 64's 1 MHz, but compatibility was a problem. CMD's SuperCPU line for the 64 and 128 promise 20 MHz performance.

Given the course of innovation at every step in the exploration of the Commodore cartridge port, I can only believe that the new accelerators will have a positive influence on the future of Commodore computing.

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Foreign Exchange

By Rick Gaudl

IN WEIN BEGINNT'S

Austrians living in the capital city of Vienna have a quaint little saying when describing an event which premiers in their glorious city, and then extends to the outer regions of Europe: "It begins in Vienna!"

On May 4, 1996, a Wienerwald Restaurant in Vienna, Austria was the site of the first public demonstration of CMD's new SuperCPU. Rudolf Sanda, club leader of the GIG-Vienna, had been in contact with CMD's European office many months prior to the May meeting. Would CMD have something new to demonstrate which he could use as a drawing card? Yes indeed, the SuperCPU was scheduled to be released in May, and we would do our best to get at least a prototype ready for May 5. On May 2, the precious cargo arrived here at my address, and the next day I was on the train heading for Vienna to meet Rudolf. We had scheduled a 'viewing' with insiders on Friday evening, as well as the Saturday show.

Before I let you in on how the show went, I must tell you that I am a die hard ice hockey fan. What in the world does that have to do with the SuperCPU? Well, it just so happens that the World Championship of Hockey was taking place that week in Vienna; the USA had made it to the semi-finals and would be playing one block away from the train station on Friday afternoon. Game time was 4 p.m. and my train arrived at 3 p.m. I wondered if I could get a ticket, see the game and still make the Friday evening meeting. Scalpers were asking about

$150 outside the ice stadium. I thought about making a sign which read: "Trade new SuperCPU for good seat!" but luckily I found a Swede who sold me his ticket for face value. With the CPU tucked safely under my seat I watched in dismay as the USA lost (they were massacred!) I was sure glad I didn't have to sacrifice the CPU to see THAT game! The evening game pitted Canada against Russia. I was tempted—but resisted. Canada won in penalty shots after the game ended in a tie. If I had swapped the CPU for a ticket to that game, it may have been worth it!

There were only a few who showed up to get a first look, but the evening demo went well. I ran the unit through a few demos and answered questions, but I hadn't had time prior to Friday to really take the thing apart and test it. That I would leave up to the specialists the next morning.

The actual club meeting on Saturday was by invitation only. Some important Commodore personalities attended. The German magazine "64er" had arranged for a programmer to interview me, take photographs of the CPU and the meeting, and write an article for an upcoming issue. Representatives from other clubs were present and videotaped the demonstration for their members. After the mandatory greetings by Mr. Sanda, I was asked to say a few words concerning the CPU project and then to introduce the unit. Knowing that the CPU could speak for itself, I suggested we play with it for the remainder of the day. I made it a point to specify that the unit which was being demonstrated was *not* the finished product. Other functions were being implemented into the processor even as we demonstrated that unit. Some guests either failed to understand this statement or were not paying attention, though, as the word "bugs" was used to describe those not yet implemented functions.

As I ran the demo disk, the room was filled with "oohs" and "ahhs". Guests politely used their elbows to get closer to the table for a better look. The same questions were asked and answered a zillion times. Two young programmers, Guenther Bauer and Andreas Varga, were given the privilege to try out their expertise on the CPU. The processor passed just about every test they put it through. Every available program was tried out on the souped-up C-64. Some programs obviously couldn't keep up with the 20 MHz. Graphic demos were quickly finished even though the accompanying music was still in its first strains. The race car game *Test Drive* proved almost too

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difficult to manage. One player 'drove' the car while his buddy switched the CPU to Normal speed in the curves then back to Turbo speed on the straight-aways. It was quite amusing to watch!

GoDot, the *best* graphic conversion program for the Commodore, ran flawlessly in Turbo mode. The author, Arndt Dettke, is also considering changes to the program to really take advantage of the newly developed speed. While the *GEOS* patches were not available for the meeting, we still managed to load the program in Normal mode, and when all disk access was finished, we switched over to Turbo mode. Drawing in *geoPaint* and scrolling in *geoWrite* were sensational!

People were overwhelmed not only at the speed, but the ease of installation. No need to take the computer apart or mess around with timing tuning. The CPU is literally a Plug & Play unit! The sturdy metal case impressed those who have seen or own another accelerator that is delivered as a 'bare board'.

Before I had arrived back home the next day, the news had spread over the Internet. My e-mail address was flooded with mail and the phone rang off the hook. What began in Vienna had rapidly spread to all parts of Europe. A new generation has dawned here for Commodore users!

The following are comments made by Guenther Bauer via the Internet, edited for grammer and readability by the Commodore World editing staff. Guenther was present for the Vienna introduction of the SuperCPU, and spent several hours analyzing it, along with programmer Andreas Varga.

On Saturday, the 4th of May, 1996, CMD introduced their newest product, the SuperCPU 64, to the public at a local GEOS meeting in Vienna, Austria.

The SuperCPU has a W65C816S processor operating at a clock speed of 20 MHz. The unit I was able to test was still a beta version prototype.

CMD's SuperCPU 64 comes in a metal case (similar in color and style to RAMLink) and has a pass-through port to add other cartridges such as Final Cartridge III, Commodore REU's, or CMD's own RAMLink. There are three switches on the upper side, plus a Turbo indicator and a Reset button. From left to right the first switch enables/disables the device, the second switch turns JiffyDOS on or off, and the third switch is used to toggle between Normal and Turbo mode (1 and 20 MHz, respectively).

The prototype didn't have the final DOS, and was not able to work with RAMLink. The JiffyDOS switch was also not yet functional, which caused trouble with some programs that insisted on using their own loading routines.

Sad news for a lot of scene dudes: the SuperCPU doesn't work with the Action/Replay MK VI cartridge; the only way to make the Action/Replay work was to totally disable the SuperCPU. The Final Cartridge III, however, did work with the SuperCPU.

Some games did benefit from the higher speed that the SuperCPU provides; among these were games like *Test Drive*. This game plays at 20 MHz nearly as smooth as an arcade game machine—well, the graphics still look a bit rough compared with an arcade machine, but the the scrolling is much smoother, and you can drive very precisely now.

F16 Combat Pilot and *Chuck Yeager's Advanced Flight Trainer* looked like real flight simulators—the added speed gives the real feel of flying.

Games like *Outrun* and *Powerdrift* did benefit a little, though the difference wasn't really very big. Other games like *Stunt Car Racer* or *Revs* are really amazing to watch, and were incredibly fast—too fast to be playable in 20 MHz mode.

Elite showed real vector power; sometimes the game looks too fast, but in other cases it is really fun to play. If you switch the SuperCPU down to 1 MHz, though, you suddenly feel like you're dealing with a snail... the performance difference is really that big. It's quite similar to driving a car at 130 Kph for a couple of hours. If you have to slow down to 50 Kph it seems like you're walking by foot.

I also tested some tools and utilities. A 110 block file was crunched using the *Cruel Cruncher*. Without the SuperCPU it is supposed to take from 15 to 30 minutes; with the SuperCPU it was finished in about a minute and a half. Decrunching is so fast that you don't even notice it. If packers use illegal opcodes, it can make the program crash, but that's understandable.

Godot!, the C-64 image processor, needs only one to two seconds to render, while it normally takes about 35 seconds. *Amica Paint* also flies, and so does *GEOS*.

In the final release version there will be a disk containing *GEOS* patches, since it's necessary to patch the floppy drivers. These patches weren't available to me at the time, so all I could do was switch down to 1 MHz to start *geoPaint* and *geoWrite*. As soon as there was no more disk access I could switch to 20 MHz—and the result was more than amazing!

In *geoPaint* the fill routines fly; filled circles now move as fast as your mouse pointer. In *geoWrite* the improvements are even better—in fact, dramatic. First of all, every time you type a letter, it appears on the screen as fast you are used to in BASIC, so no more 'typing faster than the computer can handle it'. Left-right page scrolling is now done instantly, you hardly notice the redrawing of the missing text parts. It's as fast as you would expect a PowerPC or Pentium 120 or higher to behave on a similar program.

Even better is the scroll up and down function (moving the mouse pointer to the top or bottom of the screen): while in 1 MHz mode, down scrolling is slow and up scrolling is slower yet (you have to wait several seconds for it to finish); with 20 MHz it is similar in speed to clicking on the scroll arrows of a window on a very fast PC. It was really astonishing, even more than I expected. Up and down scrolling as fast as the cursors moves!

Alignments (left, center, right, full) happen as fast as you can click on the corresponding button—it's incredible! A 'preview' of the test page I made took 1 minute and 7 seconds to complete at 1 MHz, but with the SuperCPU it was faster than 6.5 seconds.

Unfortunately, I didn't have the chance to test such applications as *geoPublish*. *GeoMORPH*, however, is now so fast that it is nearly realtime (just seconds for one frame).

Last, but not least, I want to mention some demos I tried: *Attack Of Stubidos 3* had a mandelbrot zoomer which was so fast in 20 MHz mode that it finished in seconds while the music was still playing the beginning phrase (it was initially adjusted to fit to the zoom at 1 MHz).

Vector demos (e.g. The 'burning rubber' part of a Bonzai demo) were amazing to watch; they looked way smoother and really Amiga-like. FLI, of course, doesn't work as it is timed for 1 MHz, but all texture mapping (dawnfall/oxyron) looked fast and smooth.

Andreas Varga tried to code some rastersplits on the unit. He achieved 32 splits with only about 20 lines of assembler code without using the IRQ. He felt that it might even be possible to do 2 splits in BASIC.

'Musics' which use about 18 rasterlines per frame at 1 MHz now use 1 or 2 rasterlines in Turbo mode.

All these things were tested in the emulation mode of the cpu. The real potential, of course, will be in the native mode of the SuperCPU (where you can address up to 16 MB of RAM).

Cheers,
Guenther

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Graphic Interpretation

by Paul Sullivan

GEOS FROM THE GROUND UP

I bought my C-64 in the fall of 1990, and it was a very simple arrangement: a keyboard, a 1541 drive, a joystick, a black and white T.V. and GEOS 1.3. My buddy Glen really started to get to me with his persistent teasing question, "Hey Paul, when are you going to up-grade to an *Amiga*?"

This much I knew: as a student, I just didn't have the funds to be spending thousands of dollars to get an entirely new system. So I began looking around to see what was available to me out there, and GEOS 2.0 and Q-Link online network came to my rescue. Before Q-Link closed down in late 1994, I was able to download many gems that helped me without making me go broke; tools that boost the time and output efficiency of GEOS applications to an amazing degree. Here are some that I have made good use of, and that can likely be found within a user group near you.

Boot Disk Beauties

I have five special tools added onto my GEOS boot disks that are classified as "AUTO-EXEC" or automatic executing sequential files. Quite simply, once you type in the LOAD "*", 8,1 and press return, these files will activate during the GEOS boot process in the order that they appear on the boot disk. They can be placed in any order after the boot files, take up a modest 1-3K of RAM, and don't add much more than a few seconds to the booting time, yet I think you will enjoy the results. This is the order in which they appear on my disk:

AutoClock 1.5 by Rick Koch, dated 4/15/91, takes up 2K of disk space. It puts up a small

screen that allows you to enter the current date and time, eliminating the needed mental note to update the clock once GEOS is booted. No more piles of filed dating from 7/6/88; any files that you create are automatically dated, making for much easier reference.

Next is ScreenSaver 3.2 (Blackout) by Jim Holloway, 4/28/91, which takes up 1K of disk space. During the boot process it will put up a small screen that says "installing blackout" and displays for about three seconds. This is a simple but effective screen blocker (best when used with a black border on your screen) which activates after 6-7 minutes of not hitting a key and or using a mouse or joystick. It also adds another useful feature by toggling the pointer and text priority. For example, when typing on geoWrite, the text will show "through" the pointer until it is moved, so you don't have to keep pointer shifting to read any covered words. It's been a long time since I last muttered "stupid pointer!" under my breath...

Then there is Fancy Start 1.0 by Anthony Sommers, 7/27/92, which takes up 3K. This does nothing more than put up a very colorful GEOS title screen. As Mr. Sommers put on the info screen "What's three more seconds?" It is simply an attractive amusement.

I am currently making use of a 1750 RAM expander. It doesn't have a battery backup like the CMD RAM expansion models do, so it always took me a few minutes after booting to go through my files and pick which ones I wanted to operate on the 1750. The QwikPik and QwikStash files have eliminated all that looking, highlighting, copying, waiting (yawn....) On a disk armed with these two tools, you can designate certain files to be automatically copied onto the RAMdisk during bootup. Select QwikPik and a list of that disks files will be displayed. Highlight the ones you wish to be copied to the RAMdisk. Once you press save and quit, it will produce a file called "QWIKDATA" that will make QwikStash do the work for you each time that disk is booted.

I have made use of the above tool for well over three years and they have not shown signs of any bugs nor have they given me any crash or lock-ups. There are more useful files, not in the category of "AUTO-EXEC" that I'd like to describe, so now it's time to move...

Beyond Booting!

Everybody will have their late night lapses, and one very frustrating one can be to delete one or

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more very important file(s). But don't despair! John Howard's powerful "unTrash" application (4/28/90) will list and recall multiple files that have been deleted on any disk, 5.25", 3.5" and even the RAMdisk! It will list a screen of the trashed files on a current disk, and you highlight the ones you need to have untrashed (recovered.) Take care though; a file, when trashed, can only be untrashed if nothing has been copied over it. In other words, if you delete a file or a font on Disk A, then copy some other file to Disk A, that copied file may write over the space the deleted one has taken up. If so, the deleted file cannot be recovered. Still, this useful tool is guaranteed to spare you some frustration at some point in time.

Before I bought my two 1581 drives and a 1750 RAM expander, I had to struggle along with my trusty old (but slow) 1541. The deskTop can be as slow as molasses as is redraws the file icons after leaving an application. If you don't yet have a RAM expansion unit, then Charles E. Kinne's application Switcher 1.3, 3/10/89, (not to be confused with CMD's gateWay file) can save you some time. After booting GEOS, double click on Switcher's file icon and a simple screen appears. It lists every application, and has command boxes enabling you to open an application, change a disk or drive, or cancel and return to the desktop. It appears on the screen in a tenth of the time the deskTop takes, and best of all, it is only 1K in size!

My pet peeve was the ten page geoWrite file that needed reviewing. Late at night, it was hardly considerate to the other members of my household to have my nine-pin printer screeching out ten draft-style pages. So how do you quietly but quickly review your papers? BSC Tech Unit has devised a very handy application called QuickView 1.1 (2/17/88) which enables the geoWrite user to screen dump (display all text in) a Write file at the push of a button. It's quick but no need to worry; there's a pause and an exit button so you can momentarily stop the printing and carefully review the text, or just leave the file.

Tool Kit, by Rick Krantz, 12/20/88, enables "entire document formatting." This means that fonts, page width, line spacing etc., can be adjusted on all pages of a document at once. Also, for ease of printing, two geoWrite documents can be appended, joined and more. This can save precious time when dealing with long documents.

Easy Access(ories)

There are a number of useful desk accessories that geoWrite users will find helpful. Here are a few of my favorites:

Selector 64 (9/30/89) can change the input and printer drivers currently being used. This can be helpful in geoPaint if you need to switch from using a mouse to a joystick for straight line drawing, for example. Or if utilizing more than one printer and needing to switch, then you won't have to run to the deskTop. I'd also like to mention Payton W. Snider's FontSwap 1.0 (9/17/89). If you have a large number of fonts, this tool can temporarily arrange all of your font files until the eight you want are in place.

This is only a small sample of some amazing tools that were once found on the sadly-missed Q-Link. Next time, we'll look at more GEOS boosters.

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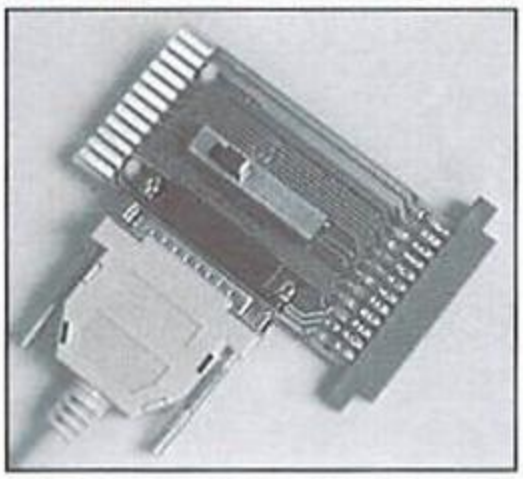

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CROSS-PLATFORM FILE TRANSFERS

PART TWO: DISK TRANSFER UTILITIES

by Doug Cotton

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As I indicated in part 1 of this series, I've commonly transferred files between various computer platforms on a daily basis for several years. While my own preference for accomplishing this has always been the null-modem method (where possible), there have been times where one of the other methods is better suited to the task.

Is Your Data Ready?

Before you start tranferring any data, though, there's another (often initially overlooked) factor in transferring data that you need to be aware of: *file translation*.

You see, if your data isn't in a format that can be easily read by the platform you're moving it to, some form of translation is in order. Often this only means converting between standard ASCII and its Commodore counterpart, PETASCII (see the chart on the following page for commonly translatable characters). Most terminal programs and transfer utilities provide this kind of translation, but there are many translation programs available online or in user group libraries that can be used for this purpose. We've included a list of many such files found on Genie in the sidebar on this page.

While ASCII/PETASCII translation is usually all that is needed for most transfers, there are other possibilities. For example, many word processing programs on the C-64 and 128 store their files in 'screen code' format. These are the codes that you would normally use to 'POKE' a given character directly into screen memory. Since the need for this type of conversion is less common, so is its inclusion in transfer utilities. But you'll still find a number of public domain programs that can perform this for you.

While it would appear that we're talking mostly about word processing files here, that isn't completely true. Many other types of programs can import and export data in ASCII or PETASCII formats. Spreadsheets, databases, and even some charting programs fall into this category.

Also, before you head off on a search for a special utility to perform your conversion, make sure that you don't overlook the obvious: nearly every word processor program produced for the 64 and 128 has a means for saving files in standard formats, or a side program for converting its own files. More often than not, you'll be able to convert your files to PETASCII without looking for additional utilities, then convert them to true ASCII while transferring to another platform. And the same is true when going the opposite direction as well.

Not that text conversions are all you might be looking for. Graphic files can also be converted and transferred between platforms, and many users do this regularly. Graphic files do require a different set of utilities, though, and there are a number of formats that can prove difficult or impossible to convert into something viewable. For a more complete discussion of converting graphics, check out the Carrier Detect column in this issue.

Utilities for Direct Disk Transfers

Several utilities are available for direct transfer of data via disk. These utilities have one thing in common: they use the ability of certain Commodore disk drives to read and write MS-DOS disk formats. By doing this, it becomes possible to use the same disks on both platforms. And since most other platforms are capable of reading the MS-DOS formats as well, these utilities aren't limited to transfers between MS-DOS and Commodore.

Among the utilities available for this purpose are Big Blue Reader (a commercial program from SOGWAP Software) and Little Red Reader (a freeware utility by Craig Bruce. RUN Magazine also published several Commodore/MS-DOS utilities, and these are available on the ReRUN disk collection now owned and distributed by Creative Micro Designs.

The RUN MS-DOS CONNECTION program from the April 1989 ReRUN disk is a C128 program that supports 1571 and 1581 disk drives for reading and writing MS-DOS disk formats of up to 360K on 1571 disk drives and 720K on 1581 disk drives. This program also offers support for 1581 partitions, MS-DOS subdirectories, ASCII/PETASCII translation, and all filetypes except for relative files. This program also strips or adds linefeeds as needed during file transfers. The main drawbacks of this program is that it doesn't format MS-DOS disks, it doesn't offer CMD FD drive support, and it has a file size limit of approximately 45K.

A C-64 version of the program, MS-DOS 64, is available on the June 1989 ReRUN disk. This program is just like the 128 version described above, but it has a reduced file size limit of approximately 30K.

Rounding out the RUN utilities is the MS-DOS FORMATTER found on the May 1989 ReRUN disk. This program supports formatting MS-DOS disks up to 360K on 1571 disk drives. It offers no support for 1581 or CMD FD drives.

Little Red Reader, by Craig Bruce, is a C128 program that supports disks up to 360K on ther 1571, 720K on the 1581, and 1.44MB on CMD

File Translation & Conversion Utilities Available on Genie

File #	File Name	Description
532	PET ASCII TO REAL ASCII	Converts PETSCII to real ascii
913	SPEEDSCRIPT UTILS.ARC	Speed to Pet & Pet to Speed + Docs
3271	ASCII/PETSCII CONVERTER	SEQ file utility by Dennis Larson.
3446	FILE TRANSLATOR	Translates SEQ-->PRG
3655	TRANSLATOR 1.2	PETSCII <---> ASCII file converter.
3783	ASCII CONVERT128	Converts Files to Pet or ASCII
3784	ASCII CONVERT64	Convert Files to Pet or ASCII
4125	VELVEETA 64	*THE* File Processor
4242	OMNI2ASCII	Convert Omniwriter files to ASCII
4386	PRINTILITY-2.SDA	Convertor/Stripper/Filter, more.
4946	ASCII CONV128 V3	TRUE ASCII to PET ASCII Conversion
5382	CONVERT	Fast ASCII to PETASCII converter
5384	CONVERT.DOCS	Docs for CONVERT (#5382)
5696	GWCONVERT6.0.CVT	Geowrite format converter.
6129	CBM-IBM.EXE	Petascii <--> Ascii converter,
6912	CBM2OTHERS.TXT	cbm<=>vax,mac,ibm,and kaypro
10140	WRONGISRITE7.CVT	v7.0 of geoWrite format converter
10834	ASCII2PETSCI.ARC	Converts true ASCII to PETSCII
17732	TEXTUT	convert text files

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ASCII, PETASCII, & SCREEN CODES

DEC	HEX	ASCII	PETASCII	SCREEN
0	$00			@
1	$01			a
2	$02			b
3	$03			c
4	$04			d
5	$05			e
6	$06			f
7	$07			g
8	$08			h
9	$09	HORIZ. TAB		i
10	$0A	LINE FEED		j
11	$0B			k
12	$0C			l
13	$0D	RETURN	RETURN	m
14	$0E			n
15	$0F			o
16	$10			p
17	$11			q
18	$12			r
19	$13			s
20	$14			t
21	$15			u
22	$16			v
23	$17			w
24	$18			x
25	$19			y
26	$1A			z
27	$1B			[
28	$1C			£
29	$1D			]
30	$1E			^
31	$1F			
32	$20	SPACE	SPACE	SPACE
33	$21	!	!	!
34	$22	"	"	"
35	$23	#	#	#
36	$24	$	$	$
37	$25	%	%	%
38	$26	&	&	&
39	$27	'	'	'
40	$28	(	(	(
41	$29	)	)	)
42	$2A	*	*	*
43	$2B	+	+	+
44	$2C	,	,	,
45	$2D	-	-	-
46	$2E	.	.	.
47	$2F	/	/	/
48	$30	0	0	0
49	$31	1	1	1
50	$32	2	2	2
51	$33	3	3	3
52	$34	4	4	4
53	$35	5	5	5
54	$36	6	6	6
55	$37	7	7	7
56	$38	8	8	8
57	$39	9	9	9
58	$3A	:	:	:
59	$3B	;	;	;
60	$3C	<	<	<
61	$3D	=	=	=
62	$3E	>	>	>
63	$3F	?	?	?
64	$40	@	@	
65	$41	A	a	A
66	$42	B	b	B
67	$43	C	c	C
68	$44	D	d	D
69	$45	E	e	E
70	$46	F	f	F
71	$47	G	g	G
72	$48	H	h	H
73	$49	I	i	I
74	$4A	J	j	J
75	$4B	K	k	K
76	$4C	L	l	L
77	$4D	M	m	M
78	$4E	N	n	N
79	$4F	O	o	O
80	$50	P	p	P
81	$51	Q	q	Q
82	$52	R	r	R
83	$53	S	s	S
84	$54	T	t	T
85	$55	U	u	U
86	$56	V	v	V
87	$57	W	w	W
88	$58	X	x	X
89	$59	Y	y	Y
90	$5A	Z	z	Z
91	$5B	[	[	
92	$5C	\	£	
93	$5D	]	]	
94	$5E	^	^	
95	$5F			
96	$60	'		
97	$61	a	A	
98	$62	b	B	
99	$63	c	C	
100	$64	d	D	
101	$65	e	E	
102	$66	f	F	
103	$67	g	G	
104	$68	h	H	
105	$69	i	I	
106	$6A	j	J	
107	$6B	k	K	
108	$6C	l	L	
109	$6D	m	M	
110	$6E	n	N	
111	$6F	o	O	
112	$70	p	P	
113	$71	q	Q	
114	$72	r	R	
115	$73	s	S	
116	$74	t	T	
117	$75	u	U	
118	$76	v	V	
119	$77	w	W	
120	$78	x	X	
121	$79	y	Y	
122	$7A	z	Z	
123	$7B			
124	$7C			
125	$7D			
126	$7E			
127	$7F			

HIGH PETASCII CODES

DEC	HEX	ASCII	PETASCII	SCREEN
193	$C1		A	
194	$C2		B	
195	$C3		C	
196	$C4		D	
197	$C5		E	
198	$C6		F	
199	$C7		G	
200	$C8		H	
201	$C9		I	
202	$CA		J	
203	$CB		K	
204	$CC		L	
205	$CD		M	
206	$CE		N	
207	$CF		O	
208	$D0		P	
209	$D1		Q	
210	$D2		R	
211	$D3		S	
212	$D4		T	
213	$D5		U	
214	$D6		V	
215	$D7		W	
216	$D8		X	
217	$D9		Y	
218	$DA		Z	

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FD drives. It also provides PETSCII/ASCII translation, and times and dates for MS-DOS files. One of the programs main advantages is that it's available online for free—even the source code is freely available.

The program's main faults are that it requires two disk drives, doesn't support MS-DOS subdirectories, and doesn't have the capability to format MS-DOS disks.

Big Blue Reader, from SOGWAP software, comes supplied with versions for both the C-64 and C-128. It supports reading and writing to MS-DOS disks up to 360K on 1571 drives, 720K on 1581 and CMD FD disk drives. It also supports reading and writing 1.44MB and 2.88MB disks on CMD FD drives, though these require special formatting. Additionally, BBR supports formatting disks on all drives supported, has ASCII, PETASCII, and screen code translation, and can read and write CP/M formatted disks. BBR can use single or multiple drives.

On the negative side, BBR cannot create the specially formated disks required for 2.88MB disk support. And the requirement of a special format makes it impossible totransfer files even on 1.44MB disks created on another computer.

LOCATION	HARDWARE	SOFTWARE	NOTES
Both computers in the same location	Null-modem cable, RS-232 interface	Terminal software on both computers	Computers are interconnected via null-modem cable, transfer files with terminal programs using xmodem, ymodem, or text buffer capture. Can transfer between any computer types.
	64NET cable	64NET	Computers are connected via special cable to create a network. Special software is operated on both computers to achieve transfers. Only for MS-DOS/Commodore transfers.
Computers are in same or different locations	C64S cable	C64S Emulator	Connects 1541 drive to MS-DOS computer via special cable. Transfer using utility included with C64S or other utilities such as TRANS64.
	A64 cable	A64 Emulator	Connects 1541 drive to Amiga computer via special cable. Transfer using utility included with A64.
	x1541 cable, 1541 drive	Special utility program running on MS-DOS PC (TRANS64, THE STAR COMMANDER, etc.)	Connects 1541 drive to MS-DOS computer via special cable. Transfer using special utilities such as TRANS64.
	1571, 1581 or CMD FD	BIG BLUE READER LITTLE RED READER	Directly read or write MS-DOS diskettes with Commodore 64/128 using one of the supported drives.
Computers are in different locations	Modem	Terminal Software	Computers are connected through modems via standard telephone lines. Transfer files with terminal programs using xmodem, ymodem, or text buffer capture. Can transfer between any computer types.

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Commodore's Delightful Demos!

By Sherry Freedline

Welcome to the first installment of articles devoted to todays most artistic Commodore expression; the Commodore Demo!

The intent of this series is to introduce some of the best NTSC and NTSC-fixed demos ever made over the past decade. Over the next few issues, we'll discover the classics of the eighties and the hottest new releases. So far this year, we've been treated to approximately 20 new NTSC/NTSC-fixed demos and probably (at the very least) four times as many PAL demos, proving the Commodore is far from dead.

What Exactly Is A Commodore Demo?

To research this topic, I popped into the IRC's #c-64 channel. Here I found a host of demo artists discussing new releases, NTSC fixes in the works, and of course other Commodore topics. (Yes, believe it or not, there is more to life than demos.) So, I casually dropped the question "What is a demo?" It didn't take long to realize that the definition varies from person to person. Next is an overview of the most important ingredients comprising an official Commodore demo.

Graphics

In my opinion, graphics are the single most important element of any demo. These graphics come in many shapes and forms including: original pictures; colorful, animated sines comprised of almost anything from simple lines to complex sprites, or totally inexplicable, must-see presentations of color.

These graphics are sometimes used to convey a message (Tears '95), tell a story (It's Coming), or just to display some amazing talent. Many demos contain more than a single page. In the multi-page demos, the spacebar is commonly used to advance from page to page. Todays demos contain an introduction announcing the group, a body displaying the unique graphics and/or routines, and a conclusion usually consisting of credits similar to that of a video production.

Text

Most (but not all) demos contain scrolling text created with custom character sets. There are endless variations employed for presentation of these scrolls. In the past they've flowed in circular paths, waves, and some of the more memorable scrolls have been upside down, backwards and even mirrored.

The text often contains greetings to friends, fellow demo groups and their individual members. At times, scrolls often contain text relevant to the demo, the Commodore world in general, and/or almost anything the author(s) wish to relay to the Commodore community.

Music

The majority of demos contain music, which plays a vital role in setting the atmosphere for the visual presentation(s). Often times the music (or digi-mixes) contained within the demo are original creations. Take it from someone who's been viewing and collecting demos for eleven years; these musical masterpieces easily take control of your mind, making you want to crank up the volume! If you've enhanced your Commodore's sound system, demos will definitely make you appreciate your efforts.

Coding

Last, but most importantly, demos use unique routines for the presentation of the demo's scroll

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and animated graphics. While in the IRC, it was pointed out to me that a demo should also be thought of as a demonstration of the abilities, talents, and knowledge of the members of the demo group. Many of the demos exist totally to show off a new routine used in a scroll or graphic presentation. Demo masters have proven time and time again that the Commodore 64 has very few limitations. The word "can't" simply doesn't exist in their vocabularies.

A Personal Definition

Okay, so that's the technical definition. Of course, I feel inclined to share my own personal demo definition. I've been an avid fan of the Commodore demo since I set eyes on them with my first online excursion around 1985. To me, a demo is a gift. It takes all the best features of the Commodore (usually the C-64): the sound, the graphics, the sprites, the colors, and the programming capabilities, and wraps them all into a Commodore gift of art.

Remember that feeling you had as a child on Christmas morning when you first glimpsed all those presents beneath the tree? Thanks to the active Commodore demo scene, I'm able to relive those feelings time and time again upon the release of an all new demo.

Where Do Commodore Demos Live?

The answer is simple: the Internet. In case you haven't had the opportunity to "surf the net", grab your modem, a VT100 capable term program, and dive in! You'll be amazed by the number of Commodore specific Web Pages and FTP sites now populating the highway. There are so many that I have a hard time restricting my world wide web bookmark file to fifty sites! More are born every day.

If you don't have access to a local Internet provider, demos can also be found on most online services such as GEnie. And if what you want isn't available on your favorite on-line services, they can even be sent to you via E-Mail, thanks to uuencoding.

NTSC & PAL

This can be a very technical subject, but because this isn't a technical series, I won't get into this too deeply. For beginning demo enthusiasts, these terms refer to your ability to view a demo. If you live in the U.S. or Canada, you're basically limited to viewing NTSC and NTSC-fixed demos. Overseas viewers have PAL Commodore systems, and therefore have the ability to view the PAL demos.

What it boils down to is the voltage used by your Commodore computer. There will be occasions where NTSC owners can view a PAL demo. But don't be surprised to find some flicker and distortion. Other times, a PAL demo just plain won't load on an NTSC system.

This topic could go into great detail if I let it, but if you'd like to learn more about it there is an NTSC/PAL discussion currently happening on Usenet's COMP.SYS.CBM news group and if all else fails you can always pop into the IRC, channel #c-64 and ask your questions there.

I rely on the talented demo makers of the World because I doubt I'll ever possess the necessary skills to create an awesome demo. The scene is still very much alive. It is these demo makers, game producers, and folks like those at CMD, along with a handful of other talented individuals (even today, they remain too numerous to name) that keep the Commodore scene alive. Finally, on to the demos...

Swish/Synth

Swinth: Glen E. Bredon
Synth: Jim Winings
Combined & Modified by: Carl A. Meahl, Jr.

Swish/Synth (also known as Swinth and Laser Show) is the program responsible for initiating my fascination with Commodore demos. While Swish/Synth may not fall totally into todays definition of a demo, it's a classic that no demo fan should ignore.

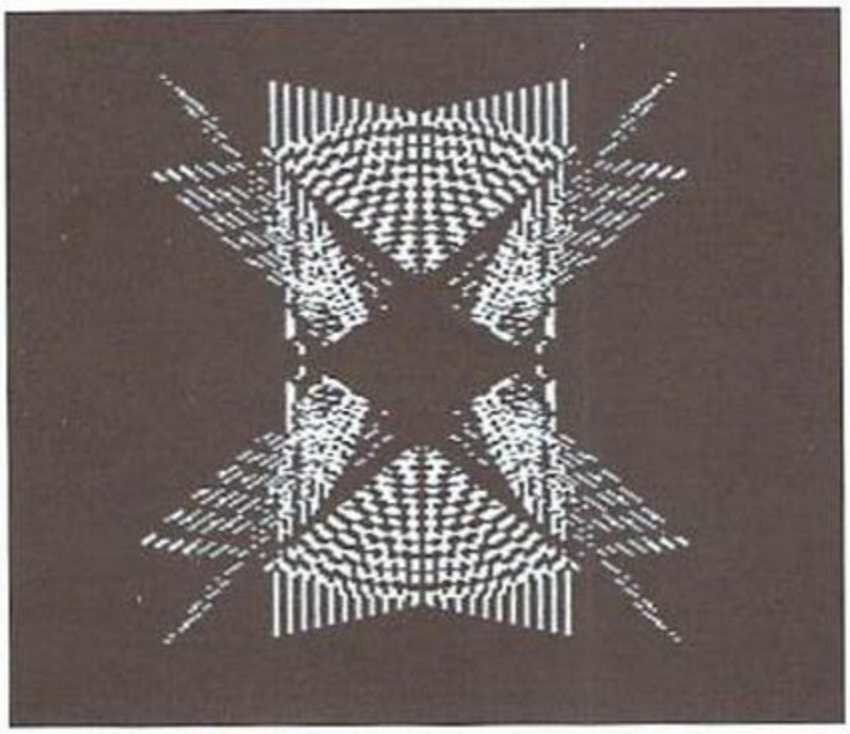
Swish/Synth made its debut in 1985. As indicated by the demo's title, the program is actually two programs combined. Swish features the graphics and Synth the music. Combined, they create quite an addicting package.

Swish/Synth is interactive, allowing the user to alter various settings as he/she desires. The two-page demo begins with an option screen informing users of the various keys that may be used to adjust the display on the following page.

A press of the spacebar opens the door to an eye-pleasing screen of dancing, animated lines, accompanied by mesmerizing music. The display reminds me of todays PC screen savers. But the Commodore version has one up on the PC; it has music. The PC versions I've seen to date only have music if you happen to pop in a CD ROM or turn on the stereo. Swish/Synth was clearly a program ahead of it's time and perhaps a predecessor to todays ever popular screen savers.

The continually changing screen alone would have been enough to keep me loading this program time and time again. But even better, the author included the options to allow you to alter the display to suit your preferences. The F1, F3, F5 keys change the colors of the line designs. F7 provides random color changes. The H and V keys adjust the horizontal and vertical symmetry respectively. The length of the designs "tail" changes with the touch of any of the numeric keys. Last, but best of all, the music can be changed to any of nine selections by simply pressing the spacebar. Some of the music may be familiar to you as it's not all original. Personally, I had a difficult time choosing a favorite because they are all terrific! Fortunately, if you leave the demo run, it will cycle through all nine songs.

By providing the above options, the authors have made Swish/Synth fun and addicting. It doesn't take long before you find yourself playing with the various options just to see the effects they create on the display.



I found a way to enjoy Swish/Synth at work and at home. In the Eighties I worked in retail (fittingly, I worked in the Electronics division where the shelves were loaded with Commodore computers and it's related accessories.) One look at Swish/Synth and I knew it was the perfect program to draw attention to the Commodore computer display. I was right, because it attracted audiences of all ages with its music and dazzling line designs.

At home, even to this day, I still load Swish/Synth for my personal

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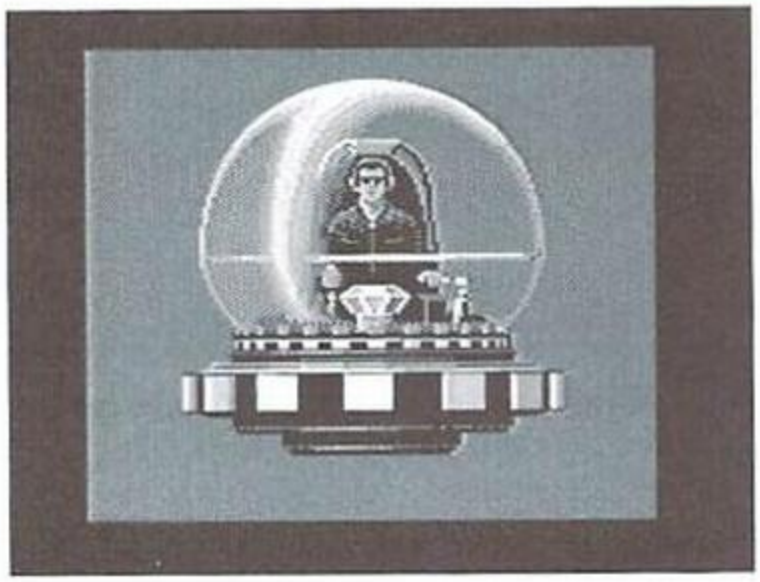

enjoyment; it's a great relaxation tool. Simply load it up, choose your favorite color settings, put on some comfy clothes and curl up in that favorite chair (hopefully within viewing distance of your monitor). You may find the tensions of the day metamorphosing into a pleasing, mellow mood.

Time Crystal by Jim Sacchs

Time Crystal followed closely upon the heels of Swish/Synth in 1985. The author states up front that he lacked the necessary means to complete Time Crystal. To the best of my knowledge, Time Crystal remains unfinished to this day.

Time Crystal appears to be telling a story. The story opens with the appearance of a human-bearing Time Crystal. Sound effects accompany the Time Crystal as it flies through magnificent multi-colored skies. The final screen leaves you wanting more as the Time Crystal lands in a pre-historic landscape and then it just... ends.

All the pages are amazing. The graphics are of professional quality. For computer art buffs, the final screen truly takes your breath away. This page contains a dinosaur, flying pre-historic birds, and a bubbling waterfall. The animation of the birds and waterfall continue until you forcefully end it. I can't help but wonder what other treats Mr. Sacchs had in mind for the completion of Time Crystal. Does anyone know?

Time Crystal also contains some music. However, it is the graphics of this demo that will stay with you. Naturally, this is another must-see classic demo that should be in your collection. Now let's move ahead to the current demo scene.

Driven

Creator & Editor: Elwix
Co-Editor & Reviewer: Coolhand

The year is 1994. Rumors are abound; the Commodore's dying. Along comes a man possessing a dream. Armed with great ambitions, dedication and skill, he's a member of Style. He needs no introduction among the great world of demos where he's known simply as Elwix. His dream: to support and promote the C-64 demo scene by way of a demo magazine.

Next comes Coolhand, an individual sharing his skills and talent. Fittingly enough they met on the "highway", a key factor to creating and spreading the dream. They combine their skills, knowledge, and great talents. The dream becomes reality and is introduced to the world on August 13, 1994 as Driven, issue number one.

Other members of the Driven staff include: Cybernoid & Decomp (NTSC demo reviewers), Skyclad (commercial editor), Perry-Beast (article editing), Iceball (PAL articles and news, CountZero (PAL demo reviews), and Tao (articles, new unannounced column, and EHQ BBS Sysop), Dr. Soft and Macx (maintains public domain release list), and many others who have freely contributed articles.

Currently, Driven arrives on the scene approximately every two months. For Driven addicts such as myself, Issue #13, should be released around May 1st, quenching your thirst for info on all the latest releases. It can easily be found on Coolhand's official Drive page, URL: http://soho.ios.com/~coolhnd. Driven can also be found on most Commodore Web Pages, FTP sites, and online services featuring a section devoted to demos.

For those of you new to the online world and the demo scene, Driven is an electronic magazine originally dedicated to supporting and promoting the NTSC demo scene. Recently they've broadened their spectrum to include coverage of the very active PAL demo scene of Eastern Europe. With the release of over 12 issues, they've proudly reached their initial goal and thus have established a new challenge; that of decreasing the divide of the NTSC and PAL demo scenes. Hopefully, they'll succeed.

Driven is currently contained within a single "crunched" file. Each edition begins with an Elwix editorial topped off with a Driven logo. Of course, all the contents are accompanied by a relaxing musical score. Next comes the menu page featuring six categories: NTSC Scenery, PAL Scenery, Commercial Scenery, Demolysis, Miscellaneous Debris, and Caught in the Net. The following is a brief overview of each division:

NTSC Scenery

NTSC Scenery will be of interest primarily to the demo fans of the United States and Canada. Located here are overviews of NTSC current releases, announcements of soon-to-be released demos, lists of demos released since last issue, a status list of NTSC demo groups and their members, current NTSC events, and an interview.

Issue 12's NTSC's Scenery "pages" informed the Commodore world of a an interesting 4k Demo Competition/Co-op. Details regarding this contest can be found on Driven's home page. Best of all was the announcement of weekly NTSC demo conferences, held every Wednesday at 9:00 PM eastern time on the IRC's channel #c-64ntsc. Here, not only can aspiring demo artists find help, but they can also discuss the scene, demo making, and find groups and/or members for their groups. Needless to say, it's a great hangout for all.

PAL Scenery

Because coverage of the PAL scene is a relatively new addition to Driven, it's not yet quite as extensive as the NTSC Scenery, although it does contain all the same information as the NTSC Scenery sub menu. Also, one must keep in mind the amount of activity within the PAL scene; it's huge! In a month's time, it's common to see around 50 PAL releases versus approximately 10 on the NTSC scene.

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Commercial Scenery

Driven's columns wouldn't be complete without a review of a Commodore product, magazine, or company. Typically these products play key roles in the continuation of the Commodore demo scene, such as telecommunications programs and utilities.

Demolysis

Look to Demolysis for reviews of recent NTSC releases. Reviews commonly include opinions by more than one person knowledgeable in the demo scene. In past issues these individuals have consistently shown the ability to creatively communicate the demo's appearance and contents effectively to their readers.

Demolysis alone makes Driven a must-have among demo fans world-wide. For individuals short on time or paying dearly for online time, Driven helps them decide which demos are most vital to their demo collections.

Miscellaneous Debris

As the title indicates, articles vital to the demo scene, but not falling into any of the other categories appear here. Generally this category contains peoples opinions on various topics in the demo scene.

This section (at times) contains a segment known as "Addies & Adverts". It's the Commodore Classifieds where ads are found and placed for recruiting group members, Commodore equipment (wanted and for sale), and almost anything else Commodore related that you might find in normal newspaper classifieds.

Caught In The Net

There's no doubt that an account with an Internet provider is a must in todays world—even for Commodore users. Caught in the Net regularly features articles focused on expanding your "surfing" abilities. Also included are E-Mail addresses for VIP's within the demo scene.

In Conclusion...

Driven is popular in both the NTSC and PAL scenes. In each issue the ambition, dedication and enthusiasm for the C-64 demo scene shines through. I asked Coolhand why he felt Driven was so popular and he replied it's because "...there are few of us that work with Driven regularly. Most of the writing is done by "non-staff" contributors... a few unsolicited, most asked by Elwix or me... but still written by people IN the demo scene. I personally think it is the variety - of topics and writers - yet consistency, of purpose and direction, that makes Driven a little unique and pretty interesting for most readers."

Are you a demo fan? If so, then download an issue today. Even if you're not a demo fan, the Internet articles and commercial product reviews are always more than beneficial.

All the creators, editors, reviewers, and contributors deserve a big round of applause, because together they've managed to give the demo scene and Commodore world in general a boost, meaning the Commodore 64 will live all that much longer.

A special thank you goes out to Elwix and Coolhand for all the help they quickly sent my way.

- S. Freedline

Hot New NTSC/NTSC-fixed Demos for 1996

January
Digital Magic/FOE
Coma Light 1/Oxyron; NTSC-Fixed by Style
Bonestripper's Return/Revenge
Driven #11
Vision/Omni

February
Fast Money/Spectre
S.E.T./FOE
Polygonamy/Stephen Judd
TP '94 Gfx Winners/NTSC-Fixed by Style
ASM '95 Gfx Winners/ NTSC-Fixed by Style
TP '95 Gfx Winners/ NTSC-Fixed by Style
Demolition Preview

March
Driven #12
Redrum/FOE
Wix Bouncer v5.0a/Style
Party Trap/Beyond Force; NTSC-Fixed by Style
Experience 3/Fatum; NTSC-Fixed by Style

April
Dawnfall/Oxryon
Temple of Boom/Style
Driven Charts Apr '96
Subliminal/RPG
Tribe/Therapy; NTSC-Fixed by Style
X-96 Gfx Winners; NTSC-Fixed by Style

- Complied by S. Freedline and Elwix

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C-64C Computer (Refurb, w/JD)	**$119.00**
C-64, C-64C Power Supply (Repairable)	$39.00
C-64, C-64C HD Power Supply (Repairable)	**$56.95**
C-128 Computer (Refurb, w/JD)	**$179.00**
C-128 Computer (Refurb, w/JD, no PS)	**$129.00**
C-128 Power Supply (Repairable)	**$56.95**
Cannon BJC-4100 Color Bubble Jet Printer	$399.00
Commodore 1541 Disk Drives (Refurb, w/JD)	**$89.00**
Commodore 1541-II Disk Drive (Refurb, w/JD)	**$109.00**
Commodore 1571 Disk Drive (Refurb, w/ JD)	**$119.00**
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geoProgrammer	$45.00
geoPublish	$40.00
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GEOS 128 v2.0	$49.00
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Books

Anatomy of the 1541	$12.00
C-64 Science & Engineering	$12.00
C128 Computer Aided Design	$12.00
C128 BASIC Training Guide	$12.00
Commodore 64 Tricks and Tips	$12.00
GEOS Programmers Reference Guide	$35.00
Graphics Book for the C-64	$12.00
Hitchhikers Guide to GEOS	$35.00
Ideas for Use on Your C-64	$12.00
Printer Book for the C64	$12.00
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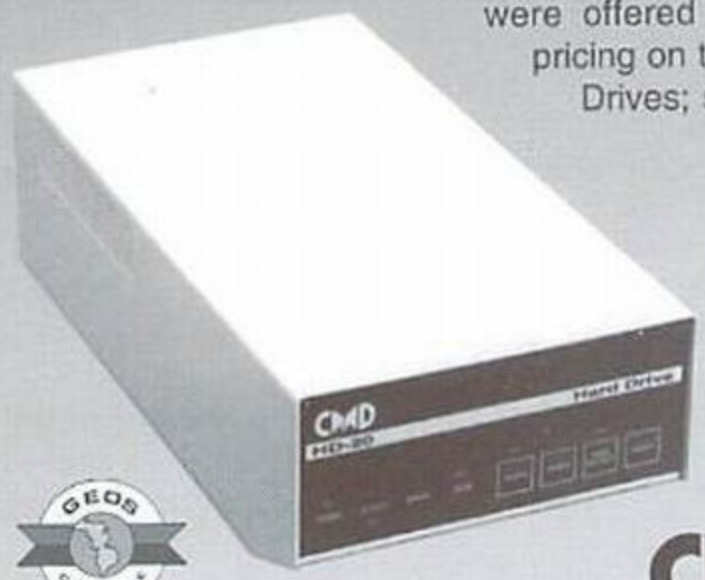

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The Lansing Area Commodore Club Expo

Article & Photographs by Max Cottrell

Gather approximately 50 Commodore users, a bunch of C64s and 128s, a sprinkling of software, and throw in a race car for a little excitement, and what do you get? A great day at the Lansing Area Commodore Club Expo! With user groups from Chicago to Muskegon, Michigan coming for a visit, and Commodore guru's like Jim Brain, Maurice Randall, Raymond Day and Eric Kudzin, the 1996 LACC Expo was a rousing success.

The Expo featured demonstrations of the Internet, online services, geoFAX, CD-ROM software, and Commodore modifications. There was also plenty of equipment for sale, including monitors and complete 128 systems.

Right: You know there's a Commodore enthusiast lurking about when you see Maurice Randall's CMD Chrysler parked nearby!

Below: Expo attendees gather around the VCR to take a video tour of the CMD facilities with Eric Kudzin

One of the highlights of the day was the half- hour long video tour of Creative Micro Designs, Inc. in East Longmeadow, Massachusetts. The tape was recorded earlier this year by Eric Kudzin. Through the magic of video, we got to see some of the great things at CMD, including the assembly of their hard drives, a whole room full of 1571 5.25 disk drives, and a ton of one of a kind Commodore computers, including a gold plated C64 (honest!) We also got to see some of the unreleased computers that Commodore had made at one time or another.

Eric Kudzin is the author of some remarkable software that allows him to play audio CDs on his C128. The on screen control panel for his CD player looks a little like the geoFAX

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If you don't know these guys, you should! From left to right: Max Cottrel, Maurice Randall, Eric Kudzin and Jim Brain.

screen, but with the usual CD commands; play, seek, tracks, etc. The software is in its final developmental stages, and may be released to the public by the end of the year. He is also working on adapting a 5.25 / 3.5 inch disk drive system from a IBM 386 to his FD 2000 drive. Eric had with him a Commodore laptop IBM clone, and a genuine Commodore calculator on display. Armed with his CMD tour, a ton of books, and some pretty unique pieces of equipment, Eric Kudzin showed that he is a definite Commodore aficionado.

Maurice Randall, as we all know, is the author and programmer of geoFAX. Maurice is working on a update of the popular software that includes some real improvements over the original. He is also working on the WAVE, one of the first Commodore World Wide Web browsers. He expects to be able to start working on it some more once the new geoFAX is out on the market. Maurice had the computer he uses (for his developmental work on geoFAX) running at the Expo. He uses a 4 MHz Turbo Master CPU for a good portion of his work. GeoFAX has the ability to allow for the use of a fax machine to scan images, which should come in handy for a lot of users.

Maurice is also the owner of the famous #93 ARCA stock car with the Creative Micro Designs logo on it. This official Commodore stock car is able to go 175 miles an hour, and should be back on the track in June. So watch for it on ESPN! (Not to mention, it is equipped with JiffyDOS, which makes it 1500% faster than an average race car!)

Jim Brain, who is another WWW browser developer for the Commodore, was also there with some of his collection of computers, including a SX64, a C65, C116, and a IBM. Wait a minute, you say. He had an IBM there? Yes, he did. We threw tomatoes at it for a while, and then Jim showed us what a graphical browser looks like when it is running on a computer. A lot of Commodore owners and users have never seen one running, so he thought it would be an interesting thing to show everyone, which it was. Jim, who is the owner of Brain Innovations, Inc., is also the editor of Commodore Hacking magazine, an Internet based magazine that he publishes. You may recall that last year Jim was also in USA Today with his collection of CBMs. Some of Jim's insights into the world of Commodore have personally helped me with my BBS and other activities dealing with CBMs.

Raymond J. Day is a 2 meg REU expert, and is currently doing 64k C128 video ram upgrades. Ray had his heavily modified C128, and the first 2 meg REU ever made (by his estimate) on display. Ray has a VIC20 font burned into a ROM in his 128, which makes his screens look different from a normal one, and is turned on and off with a poke. The font is much thinner, kind of like Sans Serif. Ray also does a lot of one-of-a-kind software applications, like his famous "Identify the disk drive ROM" program. Ray also wrote 'How big is REU", which continuously scans the memory of the REU and displays how much memory is being used on the monitor screen. He uses this when he is working on a REU. It helps show if the modifications are working.

Another highlight of the day was when the Muskegon Commodore Users Group came to visit for a while. The group purchased several items, taking home with them things like monitors, cables and some software. Members of the MCUG include teachers, students, and even a judge! The Honorable Richard Pasarela is an admitted Commodore junkie.

Also on hand were members of the Karnkee Commodore Users Group, who drove all the way from the Chicago area with Eric. The day was topped off with a lengthy and informative discussion about the state of Web browsers for the Commodore 64 and 128. The general agreement was that while a lot of work has been done to be able to get a actual IP/PPP connection to the Internet, which has been demonstrated (not at the show), that about six months to one year of work needs to be done before the software is ready for alpha or even beta testing. Expect continuing news about this in the Commodore news groups on the Internet, other Commodore web sites, and of course, in Commodore World.

The Lansing Area Commodore Club has sponsored the Expo for several years now. This one is one of the biggest in the past few years. The LACC is in its fourteenth year in Lansing, Michigan and has about 40 members, and sends out over 100 newsletters. The group is GEOS active, and has the likes of Maurice Randall and Tim Hewelt (GEOS-TIM on Genie) as members.

The LACC Expo has the potential to be much bigger than it is right now. With the talent and number of users in the Michigan and Ohio areas, the Expo is a great chance to get together once a year to compare notes, learn new things and show off our wares. With the right communication between user groups, this kind of regional show could be done across the country. "I hope that through more exposure, the Expo can grow to be a 'must go to' event", Tim Hewelt recently told me during his Tuesday night of hosting on GEnie.

The Expo was not only a lot of fun, but was informative as well. The chance to have so many of the top hackers in the Commodore industry together, as well as so many devoted users in one place was remarkable. It was enjoyable to spend a day with all of them, and I will remember it for some time to come.

Maurice Randall's GeoFAX on display.

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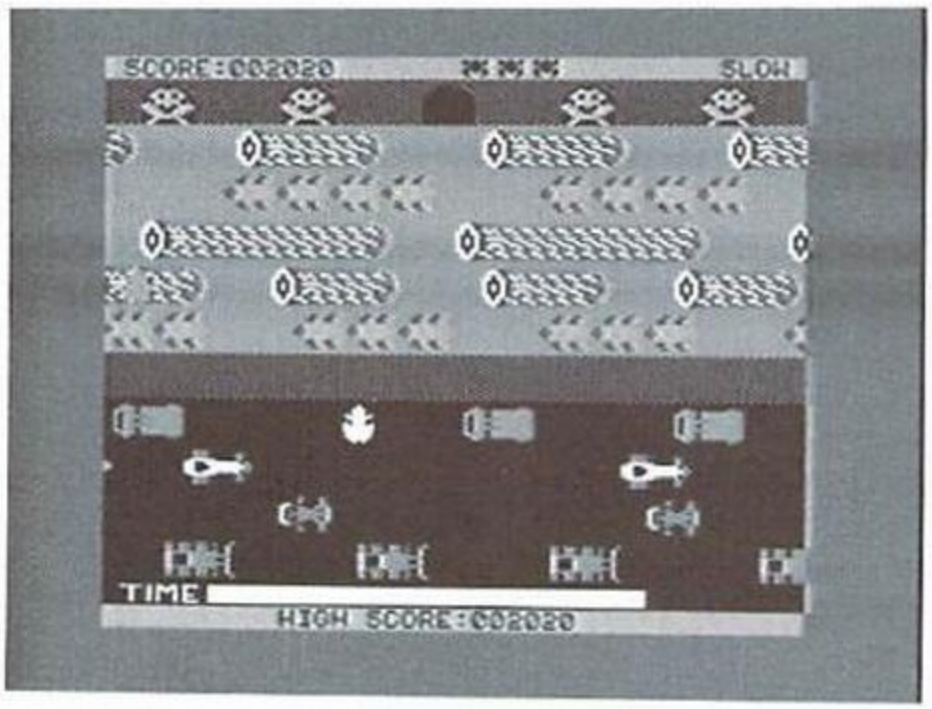

Frogger/Threshold
Sega Enterprises, Inc./
Sierra On-Line, Inc.
Impulse Software
Available from SSI

Wow, what a combination! Both of these games are sure to take you for a stroll back in time to the beginning of the 'Commodore Age'. Frogger is a notorious game which I think was first seen on the Atari game systems. Threshold brings back memories of Space Invaders and Galaga. Both Frogger and Threshold are games that I played over and over again in my youth. I can't imagine why I stopped playing them. Perhaps it was due to the introduction of other cool games just as addicting as these two. Anyway, once I loaded these games up, the first thought to come to my mind was "why did I let so much time go by since playing them?" And, of course, I was eager to introduce my daughter to the games I enjoyed when I was around her age.

Frogger

I'm sure there are some of you out there that have never played either of these classic games. So, please allow me to introduce to you them. First up is Frogger by Sega Enterprises, Inc. While waiting for the game to load (which isn't very long) prepare yourself to assume the role of a frog and get ready to do some pretty fancy leaping! The Frogger game screen is divided horizontally into two sections. At the bottom of each section is a sidewalk where you are somewhat safe. The first section is a four-lane highway filled with four different speeds of traffic. The first lane contains slow moving tractors, followed in the next lanes by normally paced cars, speedy race cars, and big trucks, respectively. Of course, the challenge is to safely leap through the lanes of traffic to the next sidewalk without becoming road pizza.

Above the second sidewalk is a stream flowing with turtles, logs, and crocodiles (or are they alligators?). Once again you must find a way to cross over this very busy stream to reach the ultimate goal of placing your frog in one of the five slots (or homes) displayed at the very top of the screen. This is more challenging than crossing the highway. The first step is to hop onto the back of one of the turtles swimming towards the left of your screen. Be careful though, because the turtles randomly dive under the water and if you happen to be on one at that moment, you'll drown. From the turtles, you must leap onto a log floating towards the right of your screen. The logs move a bit faster than the turtles do. The pattern is repeated, forcing you to land on another row of turtles and then a log before attempting to hop your frog into one of the homes. The frog's den may be already inhabited by either a fly or what looks like a wolf. If it's the fly it's safe and you'll earn extra points for capturing the fly. But, if it's the wolf, look out because he'll eat you up for a snack. You can also earn extra points by hopping onto another green frog, your "mate", who is usually floating along on one of the logs.

The action continues until you've placed a frog in each home. Once accomplished, you'll move ahead to the next level where the cars move faster and new creatures will be introduced. On successive levels, snakes slither across the sidewalk, crocodiles pollute the streams, and the cars increase their speeds and alter their timing. One note, it's safe to land on a crocodile as long as you don't land on his head or else...CHOMP!

Frogger is great fun for young and old alike. I can't believe I haven't shared this game with my ten year old long ago. As soon as I can fit it into her agenda, I'm going to introduce her to the games mom use to play when she was young. It's a great way to enjoy some quality time with her.

Threshold

Threshold is a game I also remember, but not under this title. It's a lot like Space Invaders and Galaga. Before you even load the game, pick out your best joystick or perhaps even CMD's game pad and plug it into joystick port one.

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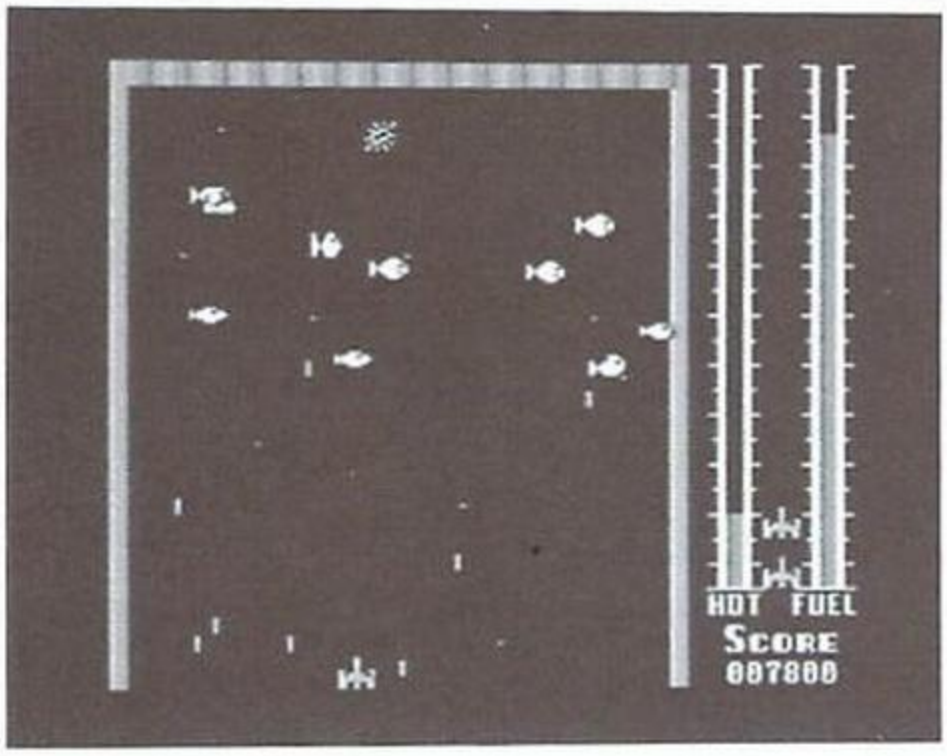


Then, while loading the game, do a few thumb stretching exercises to warm up those all important fire-button reflexes. By the time you're done, you'll find yourself in outer space in control of your very own spaceship fully equipped with its own laser weapon. Then it's time to play!

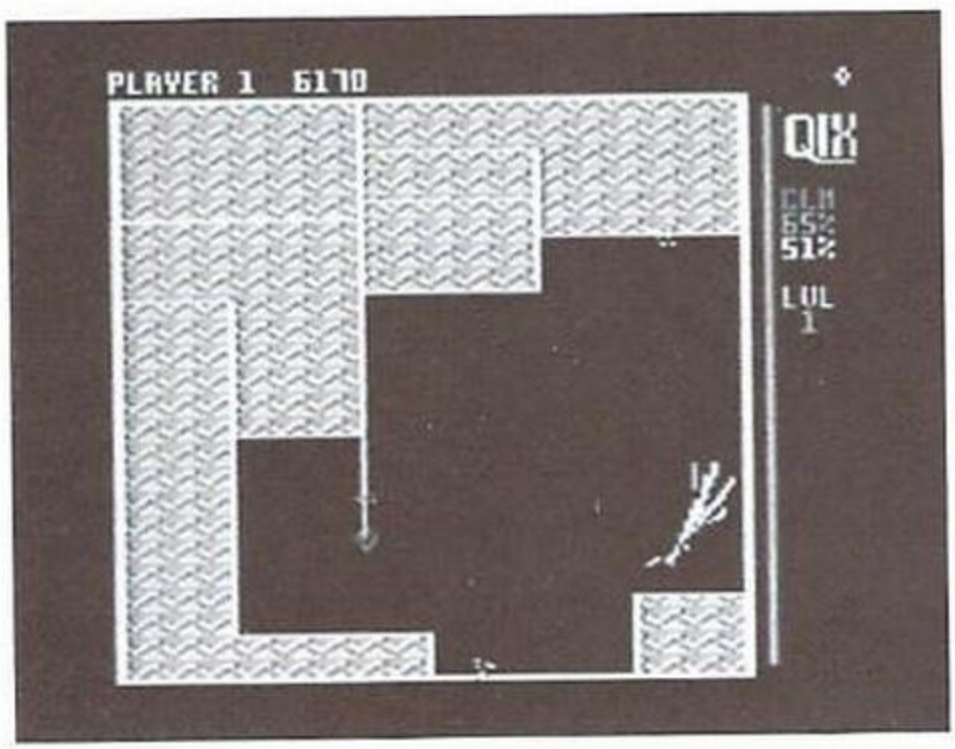
The night skies ahead of you are filled with alien creatures with a single-minded mission: destroying you and your spaceship. The aliens appear in waves consisting of maybe thirty aliens, all of the same species. The aliens are also equipped with lasers which blast at you continuously throughout the game. Additionally, these creatures will swoop down at you trying to smash into your spaceship. Of course, your goal is to obliterate the entire alien wave without being wasted yourself. Adding to the challenge is the fact that it is possible to overheat your weapon. To the right of your screen you'll find two meters displaying the temperature of your weapons and the amount of fuel remaining. When the temperature gauge begins to turn red, try to use your weapon sparingly. If it does overheat, you'll have to wait what seems like eons for your weapon to cool down while dodging and weaving to evade the oncoming beams of the aliens.

Each game provides you with five spaceships. Once you've completely annihilated five waves of aliens, your mothership comes for a visit in order to replenish your fuel supply. Then it's on to the next level of even more challenging creatures!

Threshold is your normal space shoot 'em up game, but it does stand out for many reasons. First, it's easy to play, and it is a great tool to help build up those skills needed in even harder shoot 'em up games. Plus, it even teaches you patience by forcing you to learn to use your weapon only when needed and during those times when you are forced to wait for your weapon to cool down (arrgghh!).

As I mentioned, these are two great games from the past, which should not to be forgotten. The graphics are good, but don't expect them to compare to some of the new generations of games. The best reason of all to purchase this two-pack is to pass along the goodies of our decade to the next generation. Who knows, it may even help prolong the life of our much loved Commodore Community!

- Sherry Freedline



Qix
Taito
Available from SSI

Qix (pronounced like "kicks") was introduced by Taito in November of 1988. Taito is known as a high quality Commodore game producer, due to their success with other fine games such as Bubble Bobble and Arkanoid. Looking at the Qix box reveals that this game is based on the "Original Arcade Hit". Remember the days of Pac Man, Centipede, and Asteroids? During that era, those games were responsible for devouring many of my quarters during my breaks while working in the Retail business, as well as quarters from just about every teenager alive! But those games were also responsible for diminishing stress and providing me with some fun during those work days. Qix was also one of these games.

Unfortunately, Taito's Qix is almost an entirely different game from what I remember from those long gone days. This version of Qix is a mind boggler, as opposed to the shoot 'em up game I remember from my youth. Qix is an evil virus which has infected the memory of the game's computer. Qix also has a few

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sub-viruses known as Sparx and Spritz. The game screen consists of a square representing the computer's memory. Inside the square you'll find Qix randomly fluttering about the memory. Sparx' always travel in pairs and in the same manner as Qix. Spritz' only travel along the lines of the square or any lines which you may have created. Outside the square, along the right border, is the status panel which displays the number of lives you have left, the immunization percentage goal, the percentage of memory currently immunized, and the current level. It is also here that you'll find the Sparx Timer, indicated by a red line. During game play the Sparx Timer decreases. Each time it disappears two new Sparx sub-viruses are introduced into the game.

You play the role of an immunizer, using your joystick to vaccinate the computer against infection. This feat is accomplished by moving a triangular shaped marker around the path of a square. Pressing and holding the joystick button gives you the ability to slowly draw a line; a path that is determined by the direction in which you push the joystick. This method is known as the "Slow Draw". A "Quick Draw", (as you might guess, is faster than a Slow Draw) is achieved in the same way except that you quickly press and then release the joystick button instead of continually holding it down. The goal is to completely enclose a percentage of the screen. Once a portion has been completely enclosed it will fill with a unique colorful pattern representing its immunization against the viruses. There are also some score bonuses tossed in if you manage to divide a Qix in half or trap a Spritz. And for each 50,000 points earned, a new life is awarded. A life is lost if your marker or line is touched by Qix or if your marker is touched by Sparx or Spritz.

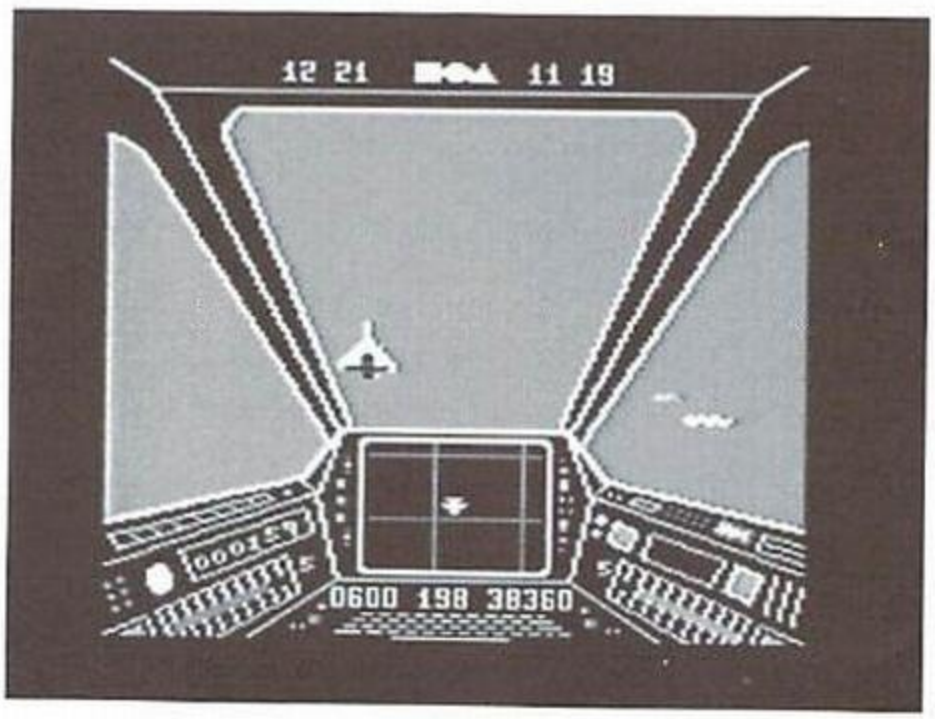
Each level requires you to immunize a given percentage of memory. Reach or surpass this percentage to advance to the next level of the game. Each successive level increases in difficulty by increasing the percentage of immunization required for completion. Also, Qix is not a dumb virus, because it learns from its previous mistakes, providing an increasingly more difficult challenge as the game progresses.

Qix can be played in both Commodore 64 and Commodore 128 (40 column) modes. The front of the game disk features the 64 version of Qix, and naturally, the 128 version is on the back. The 128 version will automatically boot upon powering up in 128 mode. There are only a few differences between the versions. The C-128 Qix game includes a High Score Screen and the music and graphics appear to be a little bit faster. Also, although only a minor feature, I really appreciated the convenience of being able to use the joystick in either joystick port.

Qix can be played with one or two players, and even provides a Practice Mode. Practice Mode allows you to brush up on your immunization techniques and die as many times as it takes to master your skills without ending the game. It's a handy feature you'll use often to start out.

Overall, Qix has good graphics. The color fills will entertain you with a variety of colorful patterns. But where Qix really shines is in the musical department, with its fantastic rock and roll accompaniment during the title screen. Sorry to say, but I loved the music more than the actual game play. I found that the game quickly became frustrating as early as level two. But for you game masters out there with "Speedy Gonzalez" reflexes, you may just find yourself a sure fire method to reach the immunization percentages. Good luck and "may the force be with you"!

- Sherry Freedline



Ray Tobey's SKYFOX

Electronic Arts
Available from SSI

Welcome to the world of SKYFOX, a game that will grasp the very core of your brain leaving, you with an addiction so strong that you may never again see the great outdoors unless, of course, you have an outdoor power supply.

SKYFOX is a fast flying, shoot 'em up game from the pros at Electronic Arts. The Skyfox is a powerful flying machine loaded with incredible speed, powerful weapons, and state-of-the-art radar and guidance systems. With the SKYFOX game, Electronic Arts provides you an opportunity to fly a truly awesome machine.

An option screen appears upon loading the game. This is where you get to select from 15 different scenarios and 5 ranks, which adds up to 75 different variations of game play! That's enough to last a lifetime! Of the 15 scenarios, the first 7 are training missions. The training missions provide every opportunity to master the control of the Skyfox. For successful games, it's very important that you take the time to learn how to use the computer's tactical map and how to engage the automatic pilot, guided missiles and heat seeking missiles. During the training missions you have the chance to blast away tanks and enemy planes. However, unlike a real invasion, you won't have the opportunity to blow up an enemy Mothership. Likewise, you're home base cannot be destroyed.

Once you feel competent at controlling the Skyfox, it's time to try out your newly acquired skills in a small invasion. During an invasion you must protect your

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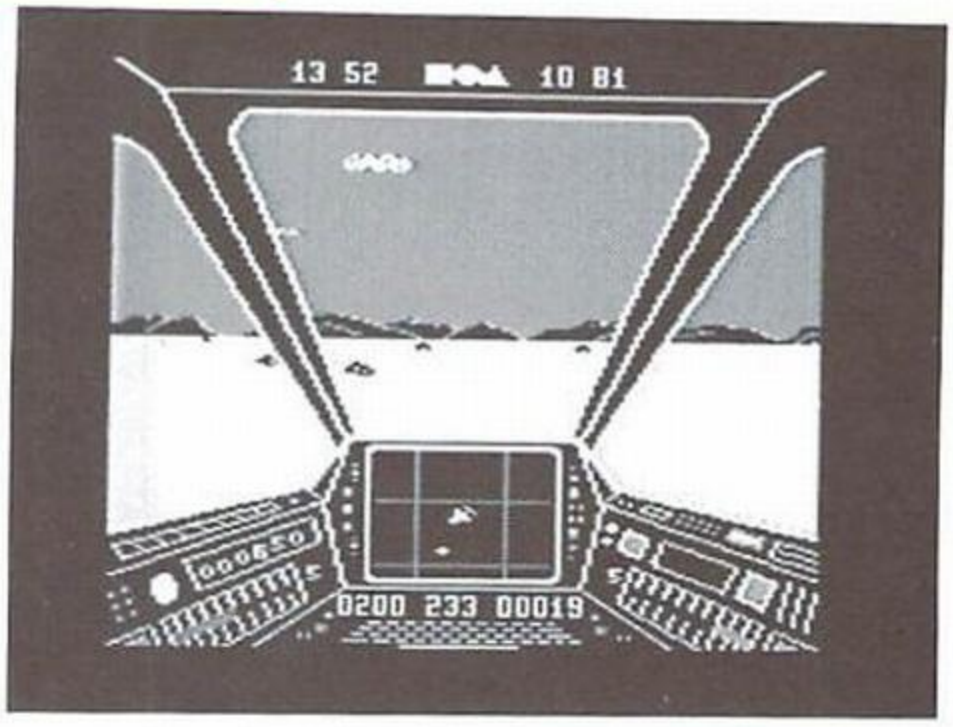
home base at all costs. If your home base is destroyed, you will lose all your remaining fighters along with your computer. Without your computer it's virtually impossible to locate enemy tanks and planes. In addition to protecting your home base, you must try to destroy all the enemy forces. I had no problem winning the small invasion. But when I tried the full invasion, it didn't take long before I lost my home base and all that it provided. Without the aid of my computer, I found myself aimlessly flying about looking for enemy troops. It didn't take long for me to abort the game with Control-R and try my luck again.

In most games of this nature I find it difficult to remember all the controls. However, although there are a variety of controls involved, Electronic Arts has taken all the difficulty away by providing a very detailed reference card and simplifying the controls as much as possible. You'll easily have them memorized after only a few training missions. There was no single outstanding feature to this game, except that the game play itself was so exciting. I sat down with all the best intentions of only spending an hour playing Skyfox. Well, believe it or not, it was well over two hours when I decided to drag myself away (and then it was only because my daughter said she was going to die if I didn't make her something to eat!) There are so many scenario combinations I doubt anyone will ever outgrow Skyfox. But before you sit down to play, remember to clear plenty of game playing time and feed your family first. Because once you begin, you'll have a hard time giving up the controls of your own Skyfox flying machine!

- Sherry Freedline



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The SysOp's Corner

By Max Cottrell

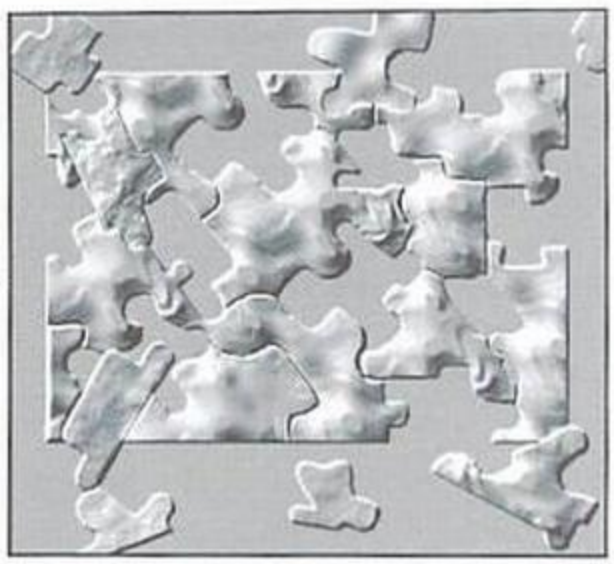
SETTING UP YOUR MENU

Would You Like a Menu?

In my last column, I touched on what your callers see when they first log onto your BBS. Obviously, all BBS software is different. This makes some of the information contained in this column not applicable to some systems, but will help enhance others. First, a word about how my system is set up and what it is designed to do. You may remember that my system is an online newspaper specializing in local news. After trying different things for several months, I finally decided to set the system up to emulate a UNIX system. I have several Internet shell accounts, and have learned to navigate the online service providers using this. Most will give you the option of either using a menu to conduct most of your business or running a UNIX (or LINUX) shell.

I have tried to emulate this structure on my BBS. I figure that more users will be using ISPs (Internet Service Providers), and will be more able to use that kind of command structure. That's what my SYSOP friends that run ISPs on large mainframes tell me. Each system uses its own twists and quirks on the commands. To rename a file for my website on one system, I have to enter the rename command and the directory. On another, I have to be in the directory that the file is in to enter the command. On yet another I have to act as if I am moving the file to another directory. Why is this handy for me? Because the commands on a BBS are like using a shell account; each system is different, each software has different commands to do the same thing. On my BBS, downloading a file takes entering "RX <filename>".

Once you get this into your head, it begins to make sense. I have made the menus as simple as I can, and have nested them as deeply as I think I need them to go. By now, you're probably scratching your head wondering what I am getting at. Many users are confused by what you and I know as simple commands. As Commodore users, typing in a command is second nature. We know what a command like 'load "$",8' means. But a lot of IBM and Macintosh users are used to the point and click method of getting around. They simply don't have the knowledge to enter a DOS command, whether it be Commodore or MS-DOS. When you take into account the fact that Macintosh users don't even get to see their DOS prompts, we have a real problem when we expect them to enter commands on a BBS.



This means that a lot of them have no idea what you mean when you tell them, "enter 'R X' <RETURN> to get a list of files to download." They just stare at the screen and hang up after a while (I see this all the time.) What I've discovered from trial and error is that a menu system is easier for the user to navigate. I have them enter commands only when they need to do something like up or downloading, change a parameter in their account, or read their E-Mail.

The way to have a menu structure that makes sense to the user is to use the "Inverted Pyramid" format; have general information in the first menu, more targeted information in the next, more specific in the next, and so on. Here's what I did for one of my main menus (just before the main command area. I keep the user out of the command area by using a loop in the menu to keep reloading the menu. This is done via a ANSI command. More on this later.)

NEWS MENU
1. Local News
2. National News
3. Multimedia Stories
4. Nature
5. Sports
6. Science
7. Enter a System Command
8. Help

<<Enter your selection>>

You can see that if the user wants to download, they can do it from the first menu by choosing number 7. This will dump them into the command prompt, which should have a list of commands that accompanies it. My software will let me insert things like date, time, user name, and number of calls that the system has had. I do this to give the BBS a polished feel to it. Another important thing is to make sure that your menus are no bigger than one screen. Having to scroll up and down is a burden a lot of callers will probably complain about it. In the above menu if the user enters number one, they get another menu, which looks like this:

LOCAL NEWS MENU
1. City Hall Information
2. News Stories
3. City Council News
4. Crime Prevention
5. Go back to the main menu
6. Help

<<Enter your Selection>>

Now the user is two menus into the nest, presented with more targeted information. This menu (the local news) narrows down the choices that the user has. If the user enters number one, they are looking at still another menu:

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CITY HALL INFORMATION
1. Phone Numbers
2. Permanent Information
3. City Council Agenda
4. Go back to the main menu
5. Help

<<Enter your Selection>>

This is about as deep as I go with this particular kind of menu. As you can see, the user can get a lot of information just by pressing number keys. My BBS also has a message board that the users can enter posts on, much like what you see on GEnie when you are in one of the Bulletin Boards. The whole point of using menus is to get the information into the hands of the user as quickly and easily as possible.

This kind of menu is also a good idea because the users can log on, grab the information, and log off quickly without having to wade through a ton of messages or posts. Since most—if not all Commodore based BBSs are single phone line based, getting the user off line ASAP is helpful.

Where To Keep Files

If you are able to, keep your files in a partition or subdirectory that the users can't access. This will keep them from downloading the raw information. Why? Because you work hard to get the files in a form for the user that looks pleasant. Remember that you are working with a PET-ASCII machine, and more than likely the user is on another brand. If you create the file while in local mode on your BBS (local mode is when you enter the BBS from the host computer, not by calling in) they may be in PET-ASCII. Which means that you can expect to hear about it if a user downloads a file and sees that all the capital and lower case letters are transposed.

Would You Like A Little ANSI With Your Dinner?

Most terminal programs have the ability to use ANSI (American National Standards Institute) GRAPHICS. I would hope that your BBS program will allow for use of these commands. The BBS software I use, Does The Job, uses most of the standard ANSI graphics and text manipulation commands, plus some that allow you to tailor the system to your own tastes. Things like menus are done with these commands. You can do some neat stuff with some mundane and standard commands. I have used ASCII art backgrounds with menus and text files, rotating colors, and even some animation. This takes time and patience to master and add to your BBS, so I recommend that you add these commands to files that stay the same most of the time. A file that you have to change every few days is not a good place to spend hours getting an animation sequence right.

Your BBS must have a way to know when you're entering an ANSI command. My system uses either C= P or CNTRL P key combos to start the input. For example, the code for a screen clear would be:

C= P [2J C= P

Confused? It's easy once you do it a couple of times. Here are the commands and what they do.

Command	Description
[xA	Move cursor up x number of lines, same column
[xB	Move cursor down x number of lines, same column
[xC	Move cursor right x number of columns, same line
[xD	Move cursor left x number of columns, same line
[x;yH (or xyH)	Move cursor to position x,y on screen
[xJ	Move cursor to end of screen
[x2J	Clear the screen
[4m	Underline on
[5m	blinking text
[7m	reverse text
[24m	underline off
[25m	blinking off
[27m	reverse text off

(Note: not all of the OFF commands will work. Use the [2J in place of it.)

Colors that you can use;

[3#m	# is the color number; 3 is for the text colors
[4#m	# is the color number; 4 is for the background color

TEXT COLORS	BACKGROUND COLORS
30	black
40	black
31	red
41	red
32	green
42	green
33	yellow
43	yellow
34	blue
44	blue
35	magenta
45	magenta
36	cyan
46	cyan
37	white
47	white

Compiled by Andrew I. Fish of Marquette University, Michigan.

DISCLAIMER: These commands do different things and won't work the same on all systems. I can only relay the results I've experienced. Refer to your software manual before trying them. I once entered a command when I was logged in from my other computer and erased all of my Special Interest Groups. So be careful and check your manuals.

As far as menus go, the commands to allow the user to enter a keypress (like an "INPUT A$: IF A$="1" then 500" command) are specific to each BBS software. It would be pointless to say how mine does it unless you are planning on using the same program I do. If you have the ability to have a "wait for a keypress" type of command, then you're all set.

Now that you are ready (I hope) to learn some of the "nuts and bolts" of running a BBS, you may want to see what the commands and graphics can look like when you call a board that uses them. Since I have literally spent thousands of hours working with this, and I enjoy helping others learn new things, I'm setting up my BBS to demonstrate what I am talking about. If you're willing to spend a few bucks on long distance, you can see what all of this stuff looks like. I am also hunting for ASCII graphics that you can buffer and use on your BBS as screen backgrounds. I even have a program kicking around here somewhere that will convert a Compuserve GIF to a ASCII art file. I've tried it with some photos and have had mixed results.

E-Mail me for information on logging onto the BBS, which should be up and running in demo mode in the near future. I'll also have a list of features of other BBS software programs for the C64 and C128.

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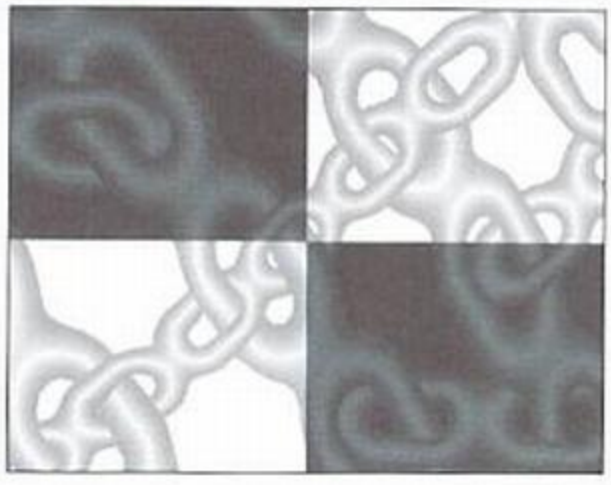
Carrier Detect

By Gaelyne R. Moranec

GRAPHIC DIVERSIONS

Now that I have a home page on the Internet, I've been delving into the world of graphics, and especially what it takes to create and view pictures that aren't "native" to Commodore. While digging around and looking at the choices we have, I've been pleased to find that we have a lot of options open to us. We can grab and view several "foreign" graphic types and better yet, we can do more than just view them, we can use them for our own purposes.



Commodore Graphics

When looking into changing a Commodore graphic to a foreign graphic type like GIF, PCX, etc., it helps to understand a few things about Commodore graphics, and the programs we use to change them to other CBM formats.

Outside of GEOS and Basic 8, there are two main categories of graphics that are used: "standard bit map" and "multi color bit map". These categories have to do with the screen resolution used when the graphic is displayed. Both formats can use color, but because they display it differently, the files are saved in separate formats. Graphic programs which use a standard bit map are Doodle, Fun Graphics Machine, Flexidraw, Art Studio and RunPaint Hi-Res. Programs that use a multi color bit map are Koala, Blazing Paddles, Advanced OCP Art Studio, RunPaint Medium-Res, and Artist64. If you spend much time with conversion programs you'll find that you can not directly change a multi color bit map graphic to a standard bit map, or vice versa. Don't spend too much time on the exercise because most conversion programs will import either type so there isn't any need to change from one to the other.

The two most common graphic formats that are accepted by most conversion programs are Doodle and Koala. If you can change a graphic from any other type art program into either a Doodle or Koala picture, you can do almost anything with it.

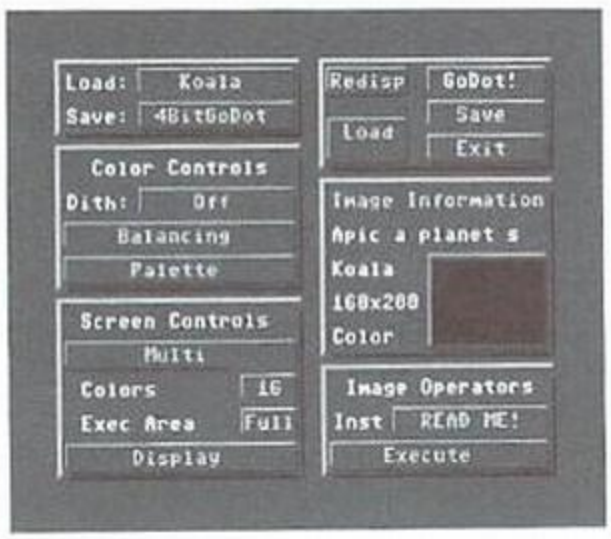
GeoPaint is also often used when converting graphics either to or from Commodore and foreign graphic formats. There are several GEOS utilities that let you import Doodle and Koala graphics to either geoPaint or Photo Scraps, which are discussed in detail below. Once a graphic is in geoPaint format, your artwork can be exported to either PCX or MAC format and shared with those poor unfortunates that don't have the luxury of having a Commodore computer. On the other side of things, you can import both GIF and PCX files to geoPaint format.

Another type of graphic format to discuss are those used by Basic 8 and IPaint. These display graphics on the C128 80 column screen in "interlaced" mode. On normal displays, the monitor has two scanlines, but only one of these is used. In interlaced mode, both scanlines display data, allowing a higher resolution and more colors to be displayed.

IPort is a companion program to IPaint which can be bought and used separately. On the Commodore side of things, IPort imports Doodle, Koala, geoPaint, and Basic 8 graphic files into IPaint format. Using the same program, you can export the IPaint graphic to GIF format for sharing with others, and retain the color of your original graphic. IPort also imports Amiga IFF files, MAC, and GIF files (all with color intact) and lets you save them in IPaint format. Hence, you can use it to convert IFF, MAC, and any of the Commodore graphic formats to GIF format. I tend to use IPort as a means to view these files without necessarily saving them.

Waiting For GoDot

I've seen the GoDot demo (pictured below), and I'm a believer. Naturally, the demo version doesn't support the saving of files, but the demo does make it possible for Commodore 64 users to view both Commodore and foreign graphic types, including many different Amiga types, and PCX. The commercial version isn't yet available outside of Europe, so we'll have to wait awhile longer for it, but meanwhile, the demo is well worth using as a means to view graphics. The godotdemo.zip can be found online via FTP at ccnga.uwaterloo.ca in the /pub/cbm/graphics directory. You will have to use either unzip101.sda for the 64 or nzp17128.sfx to unzip the archive.



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Viewing or Converting Graphics

Looking for a way to convert a graphic from one format to another, perhaps to change it to a Doodle or Koala so you can further convert it? There are some programs that will do the job; refer to the Graphics Interchange Chart to find out what graphic formats the following programs support.

One of the best Commodore graphic viewers and converters can be found online. Autograf by Fuzzy Fox (autograf.sfx), as shown above, can display both standard and multi color bit map graphics. It searches the disk directory and compiles a list of the graphic types it's capable of showing. You can select individual files or toggle the entire list and view them one right after another. It lets you copy a graphic from one format to another, and supports two disk drives.

The Fun Graphics Machine (FGM) will let you import almost any standard or multi color bit maps, but at the expense of losing any color the original file had. There are separate utilities included with the commercial version to greyscale the colors from some formats. Graphics can be saved in a variety of FGM formats, or can be exported as Doodle files. While the FGM's demo (fgmv6dem.sfx and fgmv6doc.sfx) doesn't allow you to save or print files, it's worth checking out.

If you happen to have a Super Snapshot cartridge, you can use it to view many different graphics including Koala, Doodle, Blazing Paddles, Advanced Art Studio, RunPaint, Artist64, and Flexidraw. It can also be used for capturing screens and saving them in any of the formats it supports. It was used to capture the pictures used with this article, and then I used other utilities discussed here to get the graphics into a format which the magazine could use. (Probably this will be in GIF format as the editors should be able to convert a GIF to suit their needs.)

GEOS Graphic Utilities

There are heaps of utilities you can use to import graphic files into geoPaint and Photo Scrap formats. Utilities that convert Doodle, Newsroom or Koala graphics to GEOS format include GEO Grabber (Desk Pack Plus), Import Runner (Run Powerpak #2), and online you can find excellent shareware utilities such as Graphic Storm II and Scrap It!

GeoGIF

One of the more successful means of viewing a GIF file is by using geoGIF (geogif.sfx) and converting the GIF to geoPaint format. GeoGIF strips the color from the GIF file and uses a special method of dithering, which adds texture in place of color that rivals the same type of utility on other platforms. Once in geoPaint format, the file can be converted to IPaint or Fun Graphics Machine.

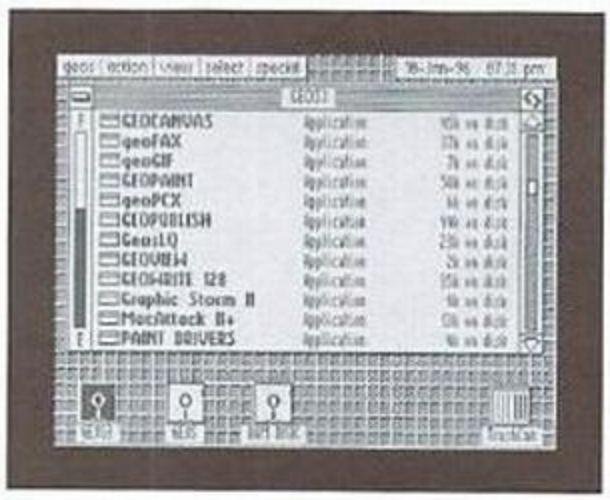
You can convert MACpaint files to geoPaint format, and you can export geoPaints to MACs using Mac Attack II by Joe Buckley. GeoPCX by Jim Collette converts geoPaint files to PCX format. To convert PCX files to geoPaint format, there's PCX/geoPaint by Doreen Horn which was published in both Commodore CEE and Australia's Commodore Network magazines.

UNIX Conversions

Since this is a telecomms column, I would be remiss if I didn't mention there are some pretty neat ways you can use your modem and do further graphic conversions. You can type the commands from your Commodore keyboard and use UNIX to convert graphics that we don't (yet!) have the facilities to deal with.

You can convert JPEG files to GIFs and then use download and view it. The utility to use is djpeg. If this is on your system, you simply give it the command: djpeg -gif -colors 8 file.jpeg >file.gif

You can select up to 256 (or more colors) or have the file greyscaled for you. If djpeg isn't on your system, you can install it for your own use. The instructions for installing it are included in the archive and it's very easy to compile. You can skip the "make install" step, as that's a sysadmin function. The file is jpegsrc.v6.tar.gz and is available at ftp.uu.net in the /graphics/jpeg directory.



VBM

Craig Bruce, the author of the ACE operating system created a new graphic file which uses the file extension of ".vbm". ACE comes with utilities that let you view or print vbm files, and there are many vbm graphics for viewing on ccnga.uwaterloo.ca in the /pub/cbm/graphics directory.

Even better, Craig wrote a Unix utility that we can install on our shell accounts that will convert "pbm" graphic files to our own "vbm" format. Once installed, you can use it with other UNIX utilities that convert graphic formats, and there are many of these, so it gives us a lot of potential. Craig's program converts a UNIX graphics format called "pbm" to "vbm". There's a UNIX package called PBM Plus which has a lot of small utilities to convert different file types, and we use it to first convert any other graphics type to "pbm" format, and then use pbmtovbm to put it in "vbm" format. We can also use PBM Plus to convert GIF, PCX and MAC files we've created on our Commodores to other formats too.

To convert a GIF to a VBM file, we use giftoppm, ppmtopgm and pgmtopbm, and finally Craig Bruce's pbmtovbm. Instead of running these as separate commands they can be "piped" into a single command:

```
giftoppm filename.gif |
ppmtopgm | pgmtopbm | pbmtovbm
>filename.vbm
```

Note that it's a pipe character (|) used in the above command, NOT a colon (:). This would make an excellent macro in your term program.

Craig's utility is in the /pub/cbm/unix directory at ccnga.uwaterloo.ca, and the filename is "pbmtovbm.c".

Endless Possibilities

Hopefully, you've learned that with just a handful of utilities, you can view and convert just about any Commodore graphic file to foreign formats, and you can import many of these "foreigners" to Commodore format, too. One of the common threads in the above utilities is that most of the Commodore graphic conversion programs involve GEOS, Doodle or Koala files. Also, don't forget that there are other resources like geoFAX, the HandyScanner, and PageFox, all of which let you import images into formats that can be used for many different purposes.

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Graphic Interchange Chart

The top portion before IPort are all C64 files. The band with IPort is the only C128 program, and the next band is to represent UNIX conversion programs.

Program		>From	To
Autograf		KO GG DD JJ AO A4 BP RP HR MR	All types imported
FGM		KO DD RP AO VB HS CE PM PG RP NR	FGM DD
SS v5		KO DD BP AO RP A4 FD	All types imported
GoDot (4)		KO DO HR MR BP P4 GEOS ILBM IFF PCX more	All types imported
GIFVERT.SDA		KO	GIF
Graphic Storm	(2)	DD HR PS PM NR	GEOS
geoGIF	(2)	GIF	GEOS
Mac Attack II	(2)	GEOS MAC	GEOS MAC
PCX/GeoPaint	(2)	PCX	GEOS
geoPCX	(2)	GEOS	PCX
IPort	(1)	IP B8 KO DD PSS GEOS IFF MAC GIF	IP GIF
PBM Plus	(2)(3)	GIF GEM MAC PCX PICT TIFF IFF more	All plus VBM
DJPEG	(2)(3)	JPEG	GIF

Legend

DD = Doodle	JJ = Compressed Doodle	PS = Print Shop screens	PM = Print Master
KO = Koala	GG = Compressed Koala	SS = Super Snapshot	VB = Video Byte II
BP = Blazing Paddles	AO = Advanced OCP Art Studio	HS = HandyScanner	CE = Computer Eyes
AS = Art Studio	A4 = Artist64	P4 = Plus4 Multicolor	FGM = Fun Graphics Machine
RP = RunPaint	NR = Newsroom	GEOS = GeoPaint or Photo Scrap	IFF = Amiga Format
FD = FlexiDraw	HR = Hi-Res	GIF = CompuServe format	MAC = MACpaint format
MR = Medium Res	IP = IPaint	PCX = IBM PC format	GEM = IBM PC format
B8 = Basic 8	PG = Print Shop graphics	JPEG = IBM/MAC format	TIFF = Workstation format

Notes:

1 Requires 64K VDC
2 Convert only (no viewing)
3 Unix Utility
4 No Save in Demo version, can view files

-Compiled by G.R.M.

Graphic Utilities Online

C64 Files

GODOTDEMO.ZIP	GoDot Demo
AUTOGRAF.SFX	View, convert and copy many CBM graphic formats
FGMV6DEM.SFX	(and FGMV6DOC.SFX) Fun Graphics Machine Demo
GRAFSTRM.SFX	Graphic Storm II Convert graphics to GeoPaint
SCRAPIT.SFX	Converts graphics to GeoPaint
GEOGIF.SFX	Converts GIFS to GeoPaint
MAC-GEOS.SFX	Mac Attack II - convert Mac's to GEOS format
GEOPCX	Convert GeoPaint to PCX
GEOVIEWR.SDA	Native mode (ie NOT GEOS) GeoPaint viewer
MACTO64.SFX	MACpaint viewer that supports printing
MAC64.ARC	MACpaint Viewer
VGIF.SFX	GIF viewer. Greyscale and Multi color give the best results. Saves graphic in Koala format
GIFFY.SFX	GIF viewer. Saves graphic in Koala format
GIFFYREU.ARC	GIFFY for REU users
JIGSAW.SFX	Jigsaw Puzzle program. Uses Doodle and Koala files
GIFVERT.SDA	Convert GG (Compressed Koala's) to GIF format
GRAFXAID.ARC	Convert Koala, Doodle, Print Shop Files
SLIDESHO.ARC	Decompress and display series of GG & JJ graphics

C128 Files

IPSLIDESHOW1.1	IPaint viewer. Requires 64K VDC
IPAINT16KVIEW2.1	IPaint viewer for 128s with 16k VDC's. Also displays IPaint's .SDI (Self Displaying) graphic files
GEOVIEW128.	Native mode GeoPaint viewer
MACVIEW.ARC	MAC viewer
FLICKR5.SDA	MAC viewer. Requires 64K VDC
GDS.SFX	GIF viewer
GIFDELACE.SFX	(also DELACER.SFX) converts interlaced GIFs to standard GIF format
GAS128.SDA	Graphic Assault System
GDS.SFX	80 column GIF Viewer
GDSLONG.ARC	640X480 module for GDS.SFX

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What type of Graphic is it?

Graphics files normally have either prefixes or suffixes that tell you what type of graphic it is.

Suffixs

CVT	GEOS file. Must be converted to GEOS format before use.
MPIC	Advanced OCP Art Studio
RPH	RunPaint Hi-Res
RPM	RunPaint Medium-Res
SDI	Self Displaying Image (IPaint).
VBM	Binary representation of X bitmap format. ACE OS (C64/128)
BMP	Windows Bitmap used by Microsoft Windows and OS/2.
GIF	Graphics Interchange Format. (Compuserve)
IFF	Amiga Format
ILBM	Amiga format
JPEG	Joint Photographers Export Group, used on many OS's. Also .JPG
PBM	Portable Bitmap. UNIX.
PCX	IBM Picture used in DOS on IBM machines.
PICT	Mac PICTure used on Apple Macintosh machines.
TIFF	Tagged Image File used on high performance workstations.
XBM	X bitmap used on the X window system.

Prefixes

..	Flexidraw and FGM Clipart files
APIC	Koala*
DD	Doodle
GG	Compressed Koala
JJ	Compressed Doodle
P-	Artist64
PI.	Blazing Paddles
PICT	Basic 8

*Koala files normally have a capital "A" in reversed video (chr$129) as the first character. To rename a Koala file so it has this character, you can use the following BASIC command:

f$=<name>:open15,<drive>,15,"r:"+(chr$129)+f$+"="+F$:close15

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GEO PROGRAMIST

by Maurice Randall

VLIR files are heavily used in GEOS, and for a good reason. Imagine if our computers had several megs of memory in them that could be directly accessed by the processor. That would allow us to load an entire large program into memory and run any part of it without any further disk access. Unfortunately, we do not have that luxury, yet it does not stop us from having large programs. The VLIR style fixes the problem for us by allowing portions of large files to remain on disk and accessed when needed.

Instead of storing a file as one continuous stream of data, the VLIR format allows us to store a file broken up into several smaller parts. Each part can be easily accessed since the starting point of each is known. The only drawback if that we must plan our programs and data files carefully. For application files, the usual method is to have a resident portion of the file in memory at all times and then have one or more areas of memory designated for modules to be loaded as needed. Routines that would be needed by more than one module could be kept in the resident portion of the application.

Working with VLIR files is easy once you get used to it. You can manipulate the files manually by using any of the GEOS sector reading routines, or you can utilize the routines that were designed specifically for VLIR files. We will need some sort of file to use as an example, so let's use a GeoWrite document, since that would be a data file that is stored in the VLIR format.

Opening A File

As with most file storage device, it's customary to 'open' a file. This is also done with VLIR files. In GEOS we can only open one VLIR file at a time. This might seem like a drawback, but in most cases only one file need be accessed at a time.

To open a VLIR file, we'll use the routine called 'OpenRecordFile'. For this to work, the file must already exist on the drive. This will not create a file for us, that will be a subject for another issue. Let's open a GeoWrite file that is called 'CMDLetter'. Here's the code for it:

```
...
LoadW r0,#namePointer
jsr OpenRecordFile
...

namePointer:
.byte "CMDLetter",0
```

You can see r0 is loaded with the address of a null-terminated filename. Once that is done, a call is made to OpenRecordFile. GEOS will search the directory of the currently open drive for this filename. If it is found, then the x register will hold a zero. Any non-zero means that the search failed. If found, the 256 bytes at fileHeader will be loaded with the file's VLIR index table, the variable usedRecords will contain the number of records in the file, and dirEntryBuf will contain the 30 bytes of the directory entry.

Accessing The Data

Let's begin by determining the number of pages in the file. We can use two routines for this, PointRecord and NextRecord. When a VLIR file is first opened, the current record will always be the first record if it exists. The first record is known as record #0 and in the case of a GeoWrite data file, there is always at least one page. We don't really need to set this first page as the current record since it will already be done, but let's do it anyway to practice.

```
...
LoadB numPages,#0
lda #0
jsr PointRecord
10$
inc numPages
jsr NextRecord
cpx #0
beq 10$
  ...

numPages:
  .block 1
```

We began by initializing our own variable called numPages to zero. This is where we'll keep count of the number of pages in this file. Once PointRecord is called, numPages gets incremented to one. Following that, the routine NextRecord will point to the next record, or GeoWrite page, and if it exists, x will equal zero. If x equals zero, a branch will occur back to increment our page counter and GEOS will be asked to point to the next record over and over again until we have attempted to go past the last page.

You might think that the GEOS variable mentioned earlier called 'numRecords' could be accessed for this info, but not in this case. A GeoWrite data file can also hold a footer and a header as well as several photo scraps. These are all stored in their own VLIR records. So, numRecords only tells us the total number of records, not necessarily the number of pages.

Let's assume that this particular file has 3 pages. We've determined that already. Now we want to load one of these pages into memory so that we can work on it. Let's have our program set aside about 8K of ram for loading in a page of data. That should be enough room. Let's begin this area at $5000. Here's how to load the page into memory:

```
...
lda #1  ;for page 2.
jsr PointRecord
LoadW r2,#$2000 ;8 KBytes.
LoadW r7,#$5000 ;load address.
jsr ReadRecord
MoveW r7,pageEnd
...

pageEnd:
  .block 2
```


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The page will be promptly read in at $5000 assuming no errors occur. Your actual program will check the x register after the call to ReadRecord to detect if an error occurred. You will want to keep track of how much data was read. GEOS will load r7 with a pointer of the address of the byte that is just past the last byte that was read in. We will save pointer so that if our program modifies the page data in any way, it can also modify this pointer so that we know how much data to write back to the drive if desired.

Writing Back To Disk

Right now, we don't really have a plan for this program. It could be a program that prints GeoWrite files, or it might be one that does global changes like changing the font or margin settings. If it is a printing program, there would be no need to write the pages back to disk. But for a program that modifies the pages in some way, writing the data back to disk is very necessary. Assume that the data is already altered and it is time to write back to the disk.

```
...
LoadW r7,#$5000
sec
lda pageEnd
sbc #[$5000
sta r2L
lda pageEnd+1
sbc #]$5000
sta r2H
jsr WriteRecord
...
```

The above code shows how easy it is to write our modified page back to the disk. The particular page is still the current record, we haven't changed it. We loaded r7 with a pointer to the start of the page in memory. Then we had to load r2 with the number of bytes to write. The bulk of the code involves subtracting $5000 from pageEnd to arrive at the number of bytes in the page. Then a simple call to WriteRecord will delete the data in the current record and replace it with the data that begins at $5000.

Closing And Updating

Once we are finished with the GeoWrite file, we must close it. This can't be simpler because only one routine need be called, 'CloseRecordFile'. No parameters are needed for this routine. Since we rewrote a portion of the file, GEOS knows this and it will update the time and date stamp for us upon closing the file. This is just one more task that we don't even have to worry about.

Okay, we did an easy one this time. We created a file using GeoWrite and modified it using our own program. What about using our own program to create a file? That gets a little tougher. We can work on that one next time.

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ASSEMBLY LINE

REVIEW AND PRACTICE

Jim Butterfield

There are a couple of subjects that you probably know about from BASIC: POKE/PEEK, and print-control characters. We'll review these, and see how easily they translate into assembly/machine language. There will also be a chance to pick up on a couple of new topics. You may have notice that the STOP key doesn't seem to work with machine language programs; this time, we'll make it work. And it might be fun to do a simple one-byte table lookup.

PEEK and POKE

The BASIC function PEEK() looks at the contents of a memory location, supplying the result as a value from 0 to 255. To do the same thing in machine language, a program usually brings the value into one of the three data registers (A, X, or Y). If we wish to test for a specific value, we can follow up with a compare instruction (CMP, CPX, CPY). As we get into more advanced areas, we'll often want to test a specific bit within the location; at that time, we'll bring in the logical instructions—AND, ORA, and EOR—into operation.

BASIC's POKE command puts a value into a memory location. A machine language program will do the same thing by setting up the value into one of its three data registers, and then storing it to memory with the appropriate store instruction (STA, STX, or STY).

As you know, many locations in your computer's memory are set up for special functions. They do such things as audio, video, timers, and general input/output. Today, we'll concentrate on just one location: 53281, or hexadecimal D021. You undoubtedly know this as the location to POKE in order to change the background color of the 64 or 128's 40-column screen.

Unprintable Characters

You probably know that there are several characters that you can "print", but they don't print anything on screen or printer. You might create these in BASIC with "programmed cursor"—those reverse-font characters that look so odd in a program listing. Or you can just as easily send them by using the CHR$() function, giving the number of the character within parentheses. Table 1 shows some of these. You may know them all from BASIC; if not, they will be useful there, too. In our test program, we'll be printing a number of these. The screen will be cleared with character $93, and we'll slip in some cursor-down movements. Our emphasis will be to use the characters that change the cursor printing color.

If you're ever in doubt about one of these characters, just ask the computer to "squeal on itself". Suppose you forgot which character homes the cursor. No problem: in BASIC, just type PRINT ASC(" .. and at this point, tap the HOME key. Since you're in programmed-cursor mode (you typed that quotes character, right?), you'll get a reverse-font S. Complete the line by closing the quotes and closing the parentheses, press return, and the value of 19 will be printed.

The STOP Key

The STOP key seems to work all the time when a BASIC program is running (except during input). To make it work when a machine language program run, our program must do what BASIC does: call Kernal subroutine STOP, which is located at address $FFE1. This subroutine will return with the Z flag clear if the STOP button is not being pressed at the moment. If the Z flag is set, somebody is holding the button, and you can take appropriate action by branching with the BEQ (Branch Equal) instruction.

By the way, the subroutine at $FFE1 changes the A register, and might also change the contents of X. If you have data you need in these registers, save them first before making the call. Our demo program will start by checking the STOP key, and will loop back to this start point on a regular basis.

Simple Table Lookup

There's a lot of things you can do with data tables, but we'll stick to the simplest. A one-byte lookup based on a one-byte index value. Our objective is this: given a number from 0 to 9, pick out an ASCII character to print. In fact, the character will be a printing color, selected from those listed in table 1.

This is a good time to state our program objective. We will allow the user to type a numeric key from 0 to 9, and set up the screen background and printing color based on the number typed. The background color will be set by a POKE to 53281 of the numeric value: 0 is black, 1 is white, and so on. As you can see from table 1, the printing colors are not arranged so neatly: for example, black is 144 and white is 5. So I'll set up a table of ten items (numbered 0 to 9), and in each slot I'll pick a color that will go harmoniously with the background. The scheme I picked is:

#	Background	Foreground	#	Background	Foreground
0	Black	05 White	5	Green	1C Red
1	White	90 Black	6	Blue	1E Green
2	Red	9E Yellow	7	Yellow	1F Blue
3	Cyan	9C Magenta	8	Orange	9B Grey 3
4	Purple	9F Cyan	9	Brown	9A Light Blue

Keep in mind that the colors in the right-hand column are my pick for harmonious foreground colors. You may substitute your own choices. Remember, though, that black-on-black is quite difficult to read.

So how do we look up the color character from this table? Simple: we put the value into X or Y, and then address the table using that register as an index. This takes us straight to the desired value. This technique requires that the table must be no longer than 256 bytes long, of course. That's as far as indexing will "reach", since 255 is the maximum value we can put in X or Y. And it helps that each table entry is only one bytes long; a table of two-byte values would call for a slightly more complex approach.

The Program

This program is specifically for the Commodore 64 or the C128 in 40-column mode, since it makes a POKE (more accurately, a STORE) to address 53281 to set the background color. First, let's check the STOP key:

```
2000 JSR $FFE1
2003 BEQ $202B
```


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If the STOP key is being pressed, the program will branch ahead to an exit point. This is the only way to stop the program.

We're branching ahead to a location we haven't encountered yet. A symbolic assembler will have no trouble with this: you would code: BEQ EXIT, and, later, label the desired point EXIT; the assembler would put it all together. If you're using a tiny assembler, such as that built into your machine language monitor, you'll have to enter the forward address as a "guess" and come back to correct it later. That's not too hard, but you need to keep careful notes so that you don't end up with an illegal address in your program.

```
2005 JSR $FFE4
```

The STOP key is not pressed, so we forge ahead and get a character from the keyboard buffer, using a call to GETIN at $FFE4. Our program must ignore anything other than the numeric keys 0 to 9. It does this by comparing the received value with this range, and branching back if the key does not fit.

In the following code, keep in mind that, after a comparison operation, BCC means "branch if less than", and BCS means "branch if greater than or equal". If the number is out of range, we go back and check the stop key again. By the way: if the keyboard input buffer is empty, a call to $FFE4 returns immediately with a value of binary zero in the A register. Can you see what happens in this case?

```
2008 CMP #$30
200A BCC $2000
200C CMP $3A
200E BCS $2000
```

If we reach this point, we have confirmed that the input character is ASCII zero through nine, hex 30 to 39. We convert this to binary with the AND instruction. The AND operation turns bits off, and with a mask of #$0F (binary 00001111), it will turn off the four highest bits in the A register. Thus, hex 30 becomes 0 and hex 39 becomes 9. Now we can store the binary value into 53281.

```
2010 AND #$0F
2012 STA SD021
2015 TAX
```

The program has also copied the binary value, 0 to 9, into the X register. We're ready to look up the ASCII character from the table that starts at address $2037. Once again, this is a forward address; if you don't have a symbolic assembler, you may need to guess, and correct later. This time, I've worked out the address for you. After we get the character from the table, we print it. This sets the foreground color.

```
2016 LDA $2037,X
2019 JSR $FFD2
```

To prove that we have changed the foreground color, we'll print a short message. HELLO! will do the job. When we look at the characters of the message later (it's located at $202C), we'll see that it starts with a "clear screen" character followed by a couple of cursor-down movements. The code is a printing loop that should be fairly familiar to you by now.

```
201C LDY #$00
201E LDA $202C,Y
2021 JSR $FFD2
2024 INY
2025 CPY #$0B
2027 BNE $201E
2029 BEQ $2000
```

After printing HELLO, the above routine goes back to the start at address $2000. At that location, the stop key will be tested again. If it's found to be pressed, the program will hop down here to the exit point. All that will be needed is a simple RTS, Return from Subroutine, to take us back to BASIC and the READY message.

```
202B RTS
```

Here's the HELLO message. It consists of ASCII characters, not instructions. If you're just using a machine language monitor, display memory from 202C to 2036, and then move the cursor up and type over the values. If you have a symbolic assembler, you'll need to use a directive such as .byte, or .db (define byte). Note that the string starts with a screen-clear character, two cursor-downs, and a space. This positions the HELLO message nicely on the screen. A RETURN character ends the message.

```
>202C 93 11 11 20 48 45 4C 4C
>2034 4F 21 0D
```

Some more data bytes, which complete our program. This is our table of "color characters"; it corresponds to the colors listed above.

```
>2037 05 90 9E 9C 9F 1C 1E 1F
>203F 9B 9A
```

After you have entered or assembled the program and have it in memory, go to BASIC and command SYS 8192. You'll get no prompt, but tapping a key in the range 0 to 9 will give you a new color combination. If you don't see one you like, or wish to experiment, modify the program! You'll find that certain colors do not work well together. The secret is: always pick a pair of colors that have differing brightness.

If you feel adventurous, there are lots of things you could add to the program. How about this: expand the number range from the ones I have given, 0 to 9, to cover 0 to 15 (or 1 to 16, if that suits your style better). You'll find that allowing two digits of input introduces new program design problems. I mean new program design challenges, which you can solve if you put your mind to them!

Table 1: Some "non-printing" characters

CHR$()		Function	CHR$()		Function
Dec	Hex		Dec	Hex	
14	0E	Text mode	142	8E	Graphics mode
17	11	Cursor down	145	91	Cursor up
18	12	Reverse font	146	92	Reverse clear
19	13	Home cursor	147	93	Clear Screen
20	14	Delete	148	94	Insert
29	1D	Cursor right	157	9D	Cursor left
13	0D	RETURN	151	97	Grey 1
5	05	White	152	98	Grey 2
28	1C	Red	154	9A	Lt. Blue
30	1E	Green	155	9B	Grey 3
31	1F	Blue	156	9C	Magenta
129	81	Orange	158	9E	Yellow
144	90	Black	159	9F	Cyan

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Peripheral Vision

By Jim Butterfield

INPUT# VERSUS THE STRING THING

The normal way to get data from a disk file is by using an INPUT# statement in your program. You'll need to OPEN the file first, and you must remember to CLOSE it when you're finished, but INPUT# is your main data-grabber. GET# will accept data too, but only one byte at a time, which slows things down.

However, INPUT# is loaded with problems. If your data file is super-neat, you can live with this. But there's a mass of things to cause you grief; we'll itemize them in a moment. Some dialects of BASIC have a "LINE INPUT#" statement which gets around almost all the problems. But the BASIC you get with your 8-bit Commodore machine just gives you that troublesome INPUT#.

Problems With INPUT#

There are several characters and conditions you might find in a data file that will cause INPUT# to give problems. Most are also true of INPUT, which reads from the screen, but we'll focus on problems encountered when reading files. Two characters, "comma" and "colon", cause the INPUT command to stop reading data into a variable. So if your data file contains such fields as "CAPTAIN NEWMAN, MD" or "Attention: SYSOP", you'll find that data gets broken up, placed into the wrong variable, or thrown away entirely.

We know we can get around the comma and colon problem by placing quotation marks around our data. INPUT removes these quotation marks, but leaves the contents alone. That leads to another problem: you might have quotation marks as part of your data, and don't want them thrown away. Too bad, if you use INPUT. The INPUT statement tends to strip out spaces that it finds at the beginning of a field. If your data field is all spaces, you'll get nothing.

Another problem is lines that are too long. You might expect a limitation of 255 characters, since that's the maximum size allowed for a string variable. In fact, it's less than that: INPUT reads a line of data into a buffer, and the buffer is often only 88 characters in size, or lower (yes, it's bigger on a 128).

Lines of data that are too short cause a different type of problem. If you have "nothing" in a data field—we call this kind of thing a "null string"—the INPUT statement will throw it away and move along to the next item, without telling anybody. For example, if you have somebody in your data base without a last name, your program may get out of step as it reads past this point. And if you have "nothing" as the last item in a file, the INPUT statement can behave very badly indeed: on some machines, it will cause a system lockup as it tries to move to the next item, which isn't there.

The GET Solution

The BASIC statement GET# can be substituted for INPUT#. The main problem is that it gets only one character at a time. So if you want to receive a string of data, you have to stick the characters together using a coding technique called "concatenation" (pronounced with emphasis on the CAT).

That costs you time and it can lead to another problem: garbage collection. As you combine strings and discard the old fragments, memory space is left idle. When garbage-collection time strikes, it will happen without warning, and your computer may freeze, which on some computers such as the Commodore 64 could last for half an hour! Most users encountering this will assume that the computer has locked up, and will turn off the power switch.

On the Commodore 128 and some earlier CBM machines, a more efficient way of storing strings virtually eliminates garbage collection delays. Whatever computer you use, GET# is a clumsy and inefficient way to read file data.

String Thing To The Rescue

In the early Commodore computer days, I adapted some code written by Bill McLean, together with the name he gave it, and tightened it up for general use with files. It's called "String Thing", and has become popular. Here's the key: all the problems we discussed about INPUT and GET exist only in BASIC. Machine code can grab a string from a disk file quickly, accurately, and efficiently.

It took me a while to devise a system that would allow BASIC to work efficiently with machine code. BASIC strings are limited in size (255 characters maximum). And they tend to move around, because of garbage collection activities. Different models of Commodore computers build and handle strings in different ways; that makes it difficult to approach the task in a general way. It was especially tricky in the pre-VIC-20 days, where one program had to work correctly in a variety of operating environments.

How To Use String Thing

I've given sample coding for a variety of machines: one for the C-64 and VIC-20, one for the C-128 in C128 mode, and a third for the pre-VIC-20 machines (PET and CBM). Type in the BASIC program; it's set up to read a sequential file called "TOUGHDATA", but you can set the file name to anything you like.

Modify the program for your own use. The important things to keep in mind are: the input variable must be the first variable defined. Also, String Thing doesn't look at variable names. It takes the first one, which had better be a string variable. Make the string variable as large as the strings you want to read. The code shown creates string A$ as size 255 bytes (a 17-byte string replicated to 15 times its original size). That's as big as a BASIC string can be.

If you create a custom string, it's wise not to make it a "literal", or simply a string in quotations. To make sure the string is stored in "dynamic" memory, do some manipulation on it. For example, don't code A$="MYSTRING" .. instead, write it as A$="MYSTRING"+"". The result is the same, but the string will be stored in a different manner. This doesn't apply to the C128, which stores all strings in dynamic memory (bank 1). Be sure to OPEN the file you wish to read by naming it logical file 1. String Thing will read only from file 1.

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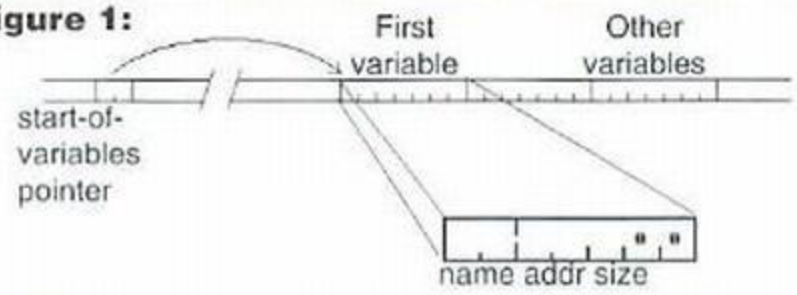
Figure 1:



The start-of variable-pointer (at addresses 45/46 in C-64) points at a table of seven-byte "variable" units. The first two bytes of each units give the variable's name and type. If the variable is a string type, the next two bytes give the address of the string, and the following one its size. The remaining two bytes are always zero. String Thing assumes that the first two variables will be the string variable entry that it will use.

After you performed an input using String Thing SYS command, the string you defined will contain input from the file. The string will still be its original length; you need to find out how many characters were input and placed into the string. You can do that with a PEEK() command. The example code given extracts the characters using a LEFT$() function. Watch out for "null" input lines, where the length will be reported as zero. If a line of input data is longer than the input string, which is set to length 255 in our example, String Thing will get what it can. The next call will get you more from the same line; nothing will be lost.

How It Works

The BASIC program reads the machine language bytes and POKEs them into place. The addresses I chose aren't totally fixed: change the POKE address to another location if it suits you; but remember to change the address of the SYS call.

Figure 1 shows how variable information is stored in the computer. Somewhere in zero page, there's a pointer called "start of variables" that tells you where the variable data is located. This data is normally just behind your BASIC program, except in the C128, where it's sited in a separate memory bank (Bank 1). Each variable item is seven bytes long. The items are stored in the order that the program creates them, and String Thing expects that your program will create its working string variable first. It doesn't look at the variable name or type: it just grabs the data, assuming that it's the right string.

The first two bytes give the variable's name, including information on its type (floating, fixed, or string). String Thing ignores this information; instead, it copies the next four bytes from the variable data. Two of these contain the address where the string is located; the third byte gives the length of the string; and the fourth byte is always zero for strings. String Thing will use that zero as an initial value for its input character counter. After that, things are simple. String Thing connects to logical file 1, reads characters, and stores them away in the string. It stops when it sees a RETURN, or when the string is full.

After the machine code has been POKEd to its destination, disassemble the code and study it if you wish. There are no obscure tricks. If you're reading the C128 version, keep in mind that the data flow has to cross over to bank 1 twice: the first time, when String Thing reads from the variable table entry, and the second time when the input data is being stowed away into the string.

The VIC-20/Commodore 64 Version

```
70 REM ** STRING THING (VIC & C64) **
80 REM **     JIM BUTTERFIELD       **
90 REM STRING MUST BE FIRST VARIABLE
100 A$="!JIM BUTTERFIELD!"
110 A$=A$+A$+A$+A$+A$
120 A$=A$+A$+A$
130 REM ABOVE SETS STRING FOR MAX (255)
200 DATA 160,2,177,45,153,137,0,200,192,6
210 DATA 208,246,162,1,32,198,255
220 DATA 32,228,255,201,13,240,15,164,142,145
230 DATA 140,200,132,142,196,139,240,4,165,144,240,234
,76,204,255
250 FOR J=896 TO 937:READ X:POKE J,X:T=T+X:NEXT J
260 IF T<>6120 THEN STOP
400 OPEN 1,8,2,"TOUGH DATA"
410 REM:  NEXT SYS SAME AS 'INPUT#1,A$'
420 SYS 896
425 REM:  L=SIZE OF INPUT (COULD BE 0)
430 L=PEEK(142)
440 PRINT LEFT$(A$,L)
450 IF ST=0 GOTO 420
460 CLOSE 1
```

The Commodore 128 Version

```
70 REM **  STRING THING  (C-128)  **
80 REM **     JIM BUTTERFIELD      **
90 REM STRING MUST BE FIRST VARIABLE
100 A$="!JIM BUTTERFIELD!"
110 A$=A$+A$+A$+A$+A$
120 A$=A$+A$+A$
130 REM ABOVE SETS STRING FOR MAX (255)
200 DATA 160,2,169,47,162,1,32,116,255,153,248,0,200,1
92,6
210 DATA 208,241,162,1,32,198,255
220 DATA 32,228,255,201,13,240,23,164,253
230 DATA 162,251,142,185,2,162,1,32,119,255
240 DATA 200,132,253,196,250,240,4,165,144,240,226,76,
204,255
250 FOR J=2816 TO 2870:READ X:POKE J,X:T=T+X:NEX T J
260 IF T<>8145 THEN STOP
270 BANK 15
400 OPEN 1,8,2,"TOUGH DATA"
410 REM:  NEXT SYS SAME AS 'INPUT#1,A$'
420 SYS 2816
425 REM:  L=SIZE OF INPUT (COULD BE 0)
430 L=PEEK(253)
440 PRINT LEFT$(A$,L)
450 IF ST=0 GOTO 420
460 CLOSE 1
```

The PET/CBM Version

This is where String Thing started. There are several models of the early Commodore 8-bit machines, and they handle strings in two distinctly different ways. So I had to be very careful with the logic so as to ensure that a single program would work correctly on all of them.

```
70 REM **  STRING THING (PET/CBM)  **
80 REM **     JIM BUTTERFIELD      **
90 REM STRING MUST BE FIRST VARIABLE
100 A$="ABCDEFGHIJKLMNOPQ"
110 A$=A$+A$+A$+A$+A$
120 A$=A$+A$+A$
130 REM ABOVE SETS STRING AT MAX (255)
200 DATA 160,2,177,42,153,134,0,200,192,6
210 DATA 208,246,162,1,32,198,255
220 DATA 32,228,255,201,13,240,15,164,139,145
230 DATA 137,200,132,139,196,136,240,4,165,150,240,234
,76,204,255
250 FOR J=896 TO 937:READ X:POKE J,X:T=T+X:NEXT J
260 IF T<>6108 THEN STOP
400 OPEN 1,8,2,"TOUGH DATA"
410 REM: NEXT SYS SAME AS 'INPUT#1,A$'
420 SYS 896
425 REM:  L=SIZE OF INPUT (COULD BE 0)
430 L=PEEK(139)
440 PRINT LEFT$(A$,L)
450 IF ST=0 GOTO 420
460 CLOSE 1
```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BASIC INSTINCTS

By David Pankhurst

I was on my way to writing a column on screen displays; discussing the screen resolutions, modes of display, pokes, and such, and do a couple of graphics programs to illustrate the display methods. My big mistake was deciding to display fractals in the example program. Before long, one program became two, then the two became three, and I found myself checking out every library book I could on the subject. No doubt there will be a future column on working with screen displays. For the next two issues, we're going to explore the world of Fractals, along with a visit to Chaos.

So What Is It?

What are we talking about with chaos and fractals? The words have been used (and abused) so much that we need to get our terms straight. Fractal is a contraction of fractional dimension. In real life, a line has width, but from a mathematical standpoint, a real line has no width, only length; a single dimension. Likewise, a square has two dimensions, length and width. A cube has three. As we'll see, a fractal is not always quite two-dimensional, but obviously more than a one-dimensional line. Hence, it is assigned a fractional dimension, a number between one and two.

Chaos is synonymous with random; the difference is that random can refer to a single event, whereas chaos refers to a state of affairs of disorder and confusion. That's the current dictionary definition. If anyone has been keeping up with the subject of chaos theory, he or she knows that even the disorder of chaos exhibits a pattern of sorts. Like fractional dimensions, we'll explore this topic as we go along. These definitions serve to prepare you for the trip, as it were.

A Chaotic Game

Let's explore chaos further now with a game called, appropriately enough, the chaos game. The program to play it is the following listing:

```
100 REM THE CHAOS GAME
105 REM
110 REM SET UP HI-RES SCREEN
115 POKE 53280,0:POKE 53281,0
120 POKE 53265,PEEK(53265)OR32
125 POKE 53272,PEEK(53272)OR8
130 FORI=1024TO 2023:POKEI,16:N EXT:REM SET COLO
R (FOREGROUND*1 6+BACK GROUND)
135 DIM I(3000):CLR
140 REM MAKE BIT MASK
145 FORI=0TO7:M(I)=2^(7-I):NEXT
150 REM DRAW TRIANGLE BORDER
155 Y=199:FOR X=0 TO 319:GOSUB2 50:NEXT
160 FOR Y=0 TO 199
165 X=(199-Y)/1.25:GOSUB 250
170 X=(199+Y)/1.25:GOSUB 250:NEXT
175 DIM PX(4),PY(4)
180 PX(1)=0:PY(1)=199:PX(2)=160:PY(2)=0:PX(3)=31
9:PY(3)=199
185 REM GET 1ST POINT
190 X=RND(-TI/179)*320:Y=RND(1)*200
195 GOSUB 250
200 REM MAIN LOOP
205 P=INT(RND(1)*3+1):REM PICK A CORNER TO HEAD
TO
210 Y=(PY(P)+Y)/2:X=(PX(P)+X)/2:REM AND GO 1/2 W
AY THERE
215 WAIT198,7
220 GETX$:IFASC(X$+" ")=13 THEN 230
225 GOSUB 250:GOTO 205
230 PRINT"<clr>":POKE53265,27:POKE53272,21
235 END
245 REM PLOT A POINT ON HI-RES SCREEN
250 B=8192+INT(Y/8)*320+8*INT(/8)+(Y AND 7):POKE
B,PEEK(B)OR M(X AND 7):RETURN
```

When run, a triangle is drawn, and a point is displayed randomly. Each time you press a key another point is displayed, based on the following rules:

1) A corner of the triangle is randomly picked.

2) A point is drawn exactly halfway between the previous point and the chosen corner.

3) Repeat from step 1, using the new point.

Keep pressing a key to assure yourself that these rules are being followed, then stop the program (by pressing the RETURN key), and delete line 215. This lets it run at full speed until you stop it again by pressing RETURN.

Before we continue on with our discussion, take a moment to predict what the result will be. Better yet, enter and run the program. Unless you're familiar with the game, the results will definitely surprise you.

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The Sierpinski Triangle

If you've run the program, or decided you can't wait, then here it is. The pattern is decidedly UN-random. Instead of a scattering of dots, there are inverted triangles within triangles, and still more within those. If you were to blow up the image, you would see smaller triangular holes in bigger triangles. What you've done with the program is display a fractal called a Sierpinski triangle. This same triangle is formed as a fractal construction, rather than a random construction, by following these rules:

1) For every triangle on screen, mark the midpoint of each of its three sides.

2) Connect all three of the midpoints, creating a third triangle in the center, and three triangles at the vertices.

3) Cut out the central triangle, leaving the three smaller ones at each corner of the larger triangle.

4) Repeat steps 1-3 on each smaller triangle.

The fact that you can arrive at this fractal object two different ways, by an ordered pattern of construction, or by randomly moving a dot, is what highlights the link between chaos and fractals.

Now that we have an example of a fractal to look at, what do we find? Although the perimeter length is obviously the same as when it started, the insides have been changed. In fact, a perfect Sierpinski triangle has no area! (If you find that hard to believe, remember the construction rules: each triangle has a center section removed, equal to 1/4 of its area. The remainder, 3/4, is further subdivided, removing 1/4 of each section. The result is an infinite expression representing the remaining area: 3/4*3/4*3/4*3/4..., or zero). Each section that appears solid is only an illusion, created by closely spaced holes that you can't see at the computer screen's resolution. This is the peculiarity of fractals; a real fractal can't be seen, has no area, and appears two-dimensional. Yet infinity resides there. If you were to add up the length of each holes' perimeter, the length would be infinite. But how can you have a perimeter without something to be the perimeter of?

Attractors and the Black Spleenwort Fern

As the chaos game ran, you no doubt noted a few stray dots. These are from the games' start, and represents points that are not in the pattern yet. Obviously, if the first dot plotted was inside the triangle at a spot that normally would have a dot, no strays would appear. But because the first are randomly placed on screen, they are not yet in the pattern. In a sense, the rules of the game lead a random number into the attractor, or final pattern. This attractor was the Sierpinski triangle, but other attractors exist. They each share the property of being a pattern that makes random numbers coalesce into non-random patterns.

Attractors can take various forms, some of them decidedly non-mathematical. Take a famous example of math imitating life, the black spleenwort fern, below:

```
100 REM FERN CHAOS
105 REM
110 REM SET UP HI-RES SCREEN
115 POKE 53280,7:POKE 53281,0
120 POKE 53265,PEEK(53265)OR32
125 POKE 53272,PEEK(53272)OR8
130 DIM I(3000):CLR
135 FORI=0TO7:M(I)=2^(7-I):NEXT
140 FOR I=1024TO2023:POKE I,16: NEXT:REM SET COL
ORS: FOREGROUND *16+BACKGROUND
145 POKE 53280,0
150 X=RND(-TI/179):N=100:W=319
155 X1=.5*W:X2=.57*W:X3=.408*W: X4=.1075*W160Y1=
0*W:Y2=-.027*W :Y3=.0669*W:Y4=.2 *W
165 X=X1:Y=0
170 R=RND(0)
175 IFR>.02THEN190:REM STEM
180 XN=0*X+0*Y+X1:YN=0*X+.27*Y+Y1
185 GOTO240
190 IFR>.17THENGOTO210:REM RIGHT LEAF
195 XN=-.139*X+.263*Y+X2
200 YN=.246*X+.224*Y+Y2
205 GOTO240
210 IFR>.3THENGOTO230:REM LEFT LEAF
215 XN=.17*X-.215*Y+X3
220 YN=.222*X+.176*Y+Y3
225 GOTO240
230 XN=.781*X+.034*Y+X4
235 YN=-.032*X+.739*Y+Y4:REM TOP
240 TX=XN:TY=220-YN
245 IF TX<0 OR TX>319 OR TY<0 OR TY>199 THEN 255
250 B=8192+INT(TY/8)*320+8*INT(TX/8)+(TY AND7):P
OKE B,PEEK(B)O R M(TX AND 7)
255 IF PEEK(198)=0 THEN X=XN:Y= YN:GOTO 170
260 PRINT"<clr>":POKE53265,27:POKE 53272,21
```

Before we go into results, a brief discussion of the program might be of interest. Lines 115-145 create a high resolution screen and set colors. Line 130 is a quick way to clear that screen by initializing a large array. The array fills the space where the screen display resides, and when automatically initialized to zero, clears the screen. Thereafter, the array's existence would only cause problems, so it is CLRed. This also highlights that only a small BASIC program can be run without protecting the screen memory in some way; not a problem in these demos.

Another programming tip is with the random number at line 170. The four routines from 180-235 each have to be executed, but for various amounts, since some have more plotting to do than others. Because the proportion of time they have to be called varies, a random number provides for this. For example, line 175 tests the random number against 0.02; since the number will be randomly below this value only about two percent of the time, the computer skips this section 98% of the time, resulting in more plotting in the other sections. Note that this selection with a random number is not part of the drawing; it only serves to apportion time to each of the routines unequally.

As you run the program, a leaf appears, and details fill in. If you had enough time, and a large enough display (or blew up parts of the output) you would see a fern in all its glory. The C64 does a fine job of displaying the fern and leaves—but smaller detail may not be visible on the high-res screen.

How does a random process capture the realism of a plant? The actual rules are simple:

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1) Draw a stem, with two leaves and some extra leaves at the top.

2) For each of the parts from step 1, subdivide them into these four parts: stem, two leaves, and top.

3) Repeat step 2 for each smaller section, forever.

As with the Sierpinski triangle, this construction would end up with an object that appears to be made of miniature copies of itself. If you look at the fern, you'll see each part of a leaf is comprised of leaves and a branch similar to the larger picture. This self-similarity at different magnifications is another common property among fractals. However, there seems to be one difference. Whereas the Sierpinski triangle started with a single object, breaking it up into smaller pieces, the fern started as four entirely different pieces. This is not the case, however; the fern is actually comprised of four pieces which are distortions of one single piece: a leaf. The right and left leaves are mirror images; the top is a short, squat version of a leaf; and even the stem is a leaf, but shrunk until it is only a thin line. These four pieces, suitably distorted, form the fern. In turn, these distorted parts at a lower level comprise the whole fern, in all its minute detail. What the numbers in the program specify is the distortion each piece goes through when plotted, such as rotated, stretched, or shrunk (the four routines at lines 175-235).

Rather than four separate constructions, each is a distorted image of the same thing. Like looking at yourself between two parallel mirrors, the smaller and smaller reflections eventually form a pattern. This construction rule would make smaller and smaller copies of the fern, eventually making the fern in its entirety. Depending on the distortion rules, (the various constants at lines 155 and 160) other objects could be created. But for these rules, we arrive at a fern leaf.

And This Means...

What does program tell us? First, fractals may be an important component of nature. If we can imitate a plant with a few rules and a dose of randomness, it's probable that the fern's genetic code did it first.

Second, fractals allow us to achieve realism. Whether the fern is actually a fractal pattern or not doesn't matter—only that we can create fern imitation mathematically. If we can imitate nature, and the result looks realistic, we have something valuable. Fractal landscapes have been used in games for years, and image processing is using fractals to create realistic conversions from color pictures to black and white. Simulations using the same techniques here have helped in understanding such subjects as Brownian motion and chemical deposition in solution of zinc.

Thirdly, and most importantly, fractals carry tremendous information. To create the fern, the program only required a few numbers. If we had to send a person a copy of the fractal, he needs only those numbers, and a program shell. Likewise, since much of life around us exhibits self-similarity, tremendous amounts of information of a visual nature could be encoded simply as fractals. Companies are already working on this, trying to quickly compress images using fractals. Instead of compression ratios of 50% or so, compression can be by factors of thousands, a great boon in these days of information glut.

Next month we continue the subject of fractals with perhaps the most famous fractals of all. Although you likely haven't heard of Julia sets, you've seen them. Meanwhile, feel free to tinker with the numbers in the second program. If you create a new image, send it in; if there's enough response, I may do another fractal column.

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CHECKSUM

Commodore World's Program Entry Checking Program and Tips on Entering Programs from this Magazine

CHECKSUM is a program that proofreads your typing when you enter a listing from the magazine. It assigns a numerical value to each character that you type, adds up the values of the line you typed and displays the sum. (Checksum, therefore, means that it checks your typing by summing the characters.) It also verifies that you have typed the characters in the proper order. (Checksum won't tell you if you miss a line of code entirely, so verify that yourself.) Checksum runs "in the background" when you type in lines of program code. Whenever you type a line and press RETURN, Checksum will display a value. Compare that value to the value published next to the line of code in the magazine. If the numbers match, you've typed the line correctly. Simple.

Typing in CHECKSUM

First, type in Checksum carefully from the listing on this page. Be sure to press RETURN after every line to enter it into memory. Once you have typed the program, *save it*. In fact, save it a few times while you're typing, just to be safe. (This is good advice whenever you type in a program. I usually change the name each time I save; for example, Checksum1, Checksum2, and so on.) Double-check your work, making sure that you've typed in every line and that you've pressed RETURN after every line you've typed. If you make errors when typing in Checksum, a test run of Checksum will tell you which line is incorrect. (This safety feature works only in the Checksum program itself, and does not apply to any other listings in the magazine.) Whenever you find a typing error (in any program listing), fix it, press RETURN to enter the change, save the program again and try another run. Repeat this process as often as necessary. Important tip: Don't get discouraged if the program won't run. Be patient. Be thorough. It will work eventually. You'll know your Checksum is ready when you see the line:

```
TO TOGGLE ON OR OFF, SYS XXXX
```

Entering Programs Using CHECKSUM

When you're ready to type in your first listing from the magazine, load and run Checksum. Make a note of the number that is displayed on the screen (49152 for the C-64; 3328 for the C-128). To activate and deactivate Checksum, type SYS followed by that number, then press RETURN. You need to have Checksum active whenever you're typing in a listing. Checksum must be deactivated, however, when you run the new program. The next step is typing in a new program listing as it appears in the magazine.

As you begin, you'll notice that to the left of the start of each line is a number. Don't type this number in: It's simply the Checksum value. Stop typing at the end of the program line and press RETURN. If you've typed the line correctly, the number displayed on the screen will match the Checksum value. If the numbers don't match, you've made a mistake. Check the line carefully, make your changes and press RETURN. The computer won't know you've made a change unless you press RETURN on the changed line to enter it. A few type-in hints: The Checksum does not verify blank spaces in the program lines unless they are within quotation marks, because adding or omitting such spaces will not affect the operation of the program. The exception to this is hexadecimal Data statements. These are the Data statements, such as this one, that don't have commas:

```
100 DATA 12345678901234567890*123456789012345
67890*12345678901234567890*
```

In statements such as these, you must have one space between the word DATA and the numbers that follow. Checksum will not catch that error.

Special Key Combinations

As you type, you may be confused the first time you see curly braces {}. These braces mean "perform the function explained within." For example, {22 SPACES} means that you need to press the space bar 22 times. Don't type the braces (you can't, of course, because there are no curly braces in the Commodore character set). Here are some other common examples:

{CLEAR/HOME}	hold down the SHIFT key and press the CLR-HOME key.
{2 CRSR DN}	tap the cursor down key twice.
{CTRL i}	hold the CONTOL key and press the I key.
{CMDR t}	hold down the COMMODORE key and press the T key.

Continue typing in your program, saving often and checking each checksum value with the one in the magazine, until you've finished the listing. Phew! So now you're ready to run your program, right? Not quite. First, save it. Second, deactivate Checksum by typing SYS followed by 49152 for the C-64 or 3328 for the C-128. Now you can run. Don't be discouraged if you still get an error. It happens. Use Checksum faithfully. Be patient. Be thorough. It will work eventually.

CHECKSUM

```
100 rem cw checksum 64/128
110 mo=128:sa=3328
120 if peek(65533)<>255 then mo=64:sa=49152
130 i=0:ck=0:ch=0:ln=300
140 for k=0 to 16
150 for j=1 to 10
160 read b:if b>255 then goto 280
170 ch=ch+b:poke sa+i,b:i=i+1
180 next j
190 read lc:if lc<>ch then goto 280
200 ch=0:ln=ln+10
210 next k
220 pokesa+110,240:pokesa+111,38:pokesa+140,234
230 printchr$(147):print"cw checksum";str$(mo):print
240 print"to toggle on or off, sys";sa:if mo=128 then 270
250 pokesa+13,124:pokesa+15,165:pokesa+25,124:pokesa+26,165
260 pokesa+39,20:pokesa+41,21:pokesa+123,205:pokesa+124,189
270 pokesa+4,int(sa/256):sys sa:new
280 print"you have a data error in line";ln;"!":end
290 rem do not change these data statements!
300 data 120,162,24,160,13,173,4,3,201,24,884
310 data 208,4,162,13,160,67,142,4,3,140,903
320 data 5,3,88,96,32,13,67,152,72,169,697
330 data 0,141,0,255,133,176,133,180,166,22,1206
340 data 164,23,134,167,132,168,170,189,0,2,1149
350 data 240,58,201,48,144,7,201,58,176,3,1136
360 data 232,208,240,189,0,2,240,42,201,32,1386
370 data 208,4,164,180,240,31,201,34,208,6,1276
380 data 165,180,73,1,133,180,230,176,164,176,1478
390 data 165,167,24,125,0,2,133,167,165,168,1116
400 data 105,0,133,168,136,208,239,232,208,209,1638
410 data 169,42,32,210,255,165,167,69,168,170,1447
420 data 169,0,32,50,142,169,32,32,210,255,1091
430 data 32,210,255,169,13,32,210,255,104,168,1448
440 data 96,104,170,24,32,240,255,104,168,96,1289
450 data 56,32,240,255,138,72,152,72,24,162,1203
460 data 0,160,0,32,240,255,169,18,208,198,1280
```


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